CHILD HYGIENE

S. JOSEPHINE BAKER

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CHILD HYGIENE

BY

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PREFACE

THE relation of child health to the welfare of the nation has long awaited recognition. "The Century of the Child" has now arrived. We know that any effort directed toward the true conservation of our national resources must begin with the conservation of child life. A nation is no stronger than the people who compose it. The health, vigor, and vitality of each adult generation depend upon the health of the children of the preceding generation. A high infant and child mortality rate is an indication of gross neglect; a high infant and child sickness rate and a high incidence of physical unfitness during childhood are a menace to civilization. Happily we have made a definite start toward our goal of universal child health. It is the purpose of this book to mark the milestones along the way. It can do little more than that.

The necessary limitations of this book have been those of space, the desire to make it intelligible and helpful to the interested lay worker, as well as a practical aid to the public-health official and the vast extent of the field to be covered. It has been practical to discuss only the fundamental features of child hygiene, leaving detailed consideration of the subject to the more specialized publications. If this work stimulates interest in health work for children, the purpose in writing it will have been achieved.

For the reasons given, no attempt has been made to discuss child health work in any country other than the United States. The occasional reference that has been made to the situation in foreign countries is only for the purpose of calling attention to the comparative conditions that exist and as a basis for studying any lessons that may be drawn therefrom. The evolution and present status of child hygiene

varies in different countries. Certain of these, notably England and some of the British colonies, are, in many directions, farther advanced in their work for child health than the United States. There are other countries that are still neglectful of child welfare. In all of these countries, and in the United States, health work for children is changing in its methods and results from day to day. New features, new methods, and new ideas are constantly being brought forward and acted upon. Old methods are being discarded. Any attempt to evaluate public-health work for children must take this into consideration. Notwithstanding all of these changes, the fundamentals of child hygiene have now been established and certain methods have stood the test of time. These afford a groundwork upon which anyone may build. The subjects and methods that have been considered are those that seem basic. A more extended knowledge of the subject may be acquired by reference to the great mass of literature on child hygiene that has accumulated, and an intimate study of the work in this direction that is now being carried on.

The organizations and forces that are engaged in child-welfare work have been mentioned only in part and for the purpose of studying certain *types* of work. The limitation of space has precluded any extended consideration of mental hygiene, sex education, the prevention of tuberculosis and several other important social and health topics. Each of these subjects has a definite place in a broad child-welfare program, but an intimate and detailed discussion of their purpose and methods, to be of any real value, would require more space than is at my disposal.

Child hygiene or public-health work for children differs in an essential particular from every other public-health effort. Children constitute an *age group*. Child hygiene concerns itself with everything that affects the health of the child, from the beginning of the prenatal period to the end of adolescence. Its success depends upon the recognition that everything that concerns life in any way concerns

the child more definitely than it does the adult. Other types of public-health work generally deal with a function or a special condition. Thus our public-health departments have bureaus or divisions that are concerned with the control of communicable diseases, the supervision of the production and distribution of foods and drugs, the sanitation and hygiene of the community, bacteriology, research, vital statistics, and the hygiene of industry. Each of these deals with the specified object. Child hygiene deals with all of them as they affect the health of the child. More particularly it is concerned with the child as an individual and children as a group. An analogy might exist if our departments of public health were divided, in their administrative efforts, into the two main divisions of child hygiene and adult hygiene, with all the public health functions included in each group.

Priority in the establishment of organized child health work under governmental control belongs to the Bureau of Child Hygiene of the New York City Department of Health (1908). The credit for the extension of child hygiene in the United States cannot be assigned to any individual or to any one organization. The present improved conditions surrounding child life in this country are the result of extended public-health education, organized effort through public and private health agencies—national, state and local—co-operative effort of all health organizations of whatever type and status, the intelligent interest and co-operation of public spirited citizens, public officials, physicians, nurses, social workers, teachers, dentists, and all others who are interested in and who have contributed toward the welfare of children. If any definite acknowledgment may be made of the efforts of any group of workers, in our achievement of improved health for the children of our country, it should be given to those devoted, tireless, efficient, "soldiers of the first line of defense," the rank and file of public-health doctors and public-health nurses.

I wish to acknowledge my indebtedness to all of the

authorities whose work has been freely consulted and used. To my former associates and co-workers in the Bureau of Child Hygiene of the Department of Health, New York City, I wish to express my deep appreciation and gratitude for the inspiration of our years of service together; an inspiration which has made this book possible.

S. Josephine Baker.

CHILD HYGIENE

"Does any mother die needlessly in giving birth to her child? Does any child die needlessly? Does every child born have a fair chance for sheer existence, first, and then for growth in an atmosphere of physical and moral decency and mental vigor—all of which are indispensable if liberty is to be full-fledged? Less than this for our nation's children cannot satisfy the richest and most generous of democracies. Nor does aught short of a universal conception satisfy the prophecy of those who founded our government on a basic theory that social democracy could be slowly but surely recognized under it."

—Julia C. Lathrop.

CHILD HYGIENE

CHAPTER I

THE CHILD, THE PARENT, AND THE STATE

"Our responsibility for children is based not alone on human aspirations, but it is also based upon the necessity to secure physical, mental and moral health and the economic and social progress of the nation. Every child that is delinquent in body, education, or character is a charge upon the whole community, as a whole, and a menace to the community itself. The children are the army with which we march to progress."

—HERBERT HOOVER

CHILD HYGIENE is a term referring to all conditions pertaining to the health of children from the beginning of the prenatal period to the end of adolescence.

The child-hygiene movement as we know it to-day is essentially modern. In its methods, technique, and results it stands by itself as a distinct achievement, yet, vague as the historical background may be, we find that in isolated instances there was a recognition centuries ago that the welfare of the child was the concern of the state, and that it affected society as a whole. It may be assumed that the parental instinct has always been present, though its manifestation at times seems exceedingly tenuous.

It is impossible to place any definite date as marking the first assumption by the state of a manifestation of direct authority over the welfare of children. One of the first and most interesting accounts comes to us in the record of the reign of Lycurgus of Sparta. The exact dates of his reign are unknown, but it is generally placed as having occurred

at about the time of the first Olympic games. This method of estimating the relative importance of events finds its modern analogy in our tendency to register the birth of a valuable horse or dog and neglect to afford the same legal recognition to the birth of a baby. It is probable that Lycurgus reigned about 776 B.C. In *Plutarch's Lives* we find a vivid account of the welfare measures instituted by Lycurgus. Many of these laws and methods were beneficent; many were cruel and wasteful of life, but from some of the best of these laws we gain an insight into the fundamental basis upon which much of our modern child-welfare work is founded.

From Lycurgus' methods the word *Spartan* has come to denote a rigorous system of living and the ability to withstand pain and hardship with great fortitude. Our interest, however, is mainly concerned with the fact that this is the first recorded instance where the child was considered the property of the state, and as such to be cared for in a way that would place the state in the highest possible position of security. The Spartan laws were strict and far reaching. All citizens were considered equal. There was an avoidance of luxury. Lycurgus considered the education of youth as "the most important and noblest work of the lawgivers." He regulated the circumstances surrounding marriage in order that both parents might be in good condition and that conception and birth might be safeguarded. Girls and young women were required to exercise and take part in outdoor games in order to strengthen their bodies and thus to make child-birth easier and children healthier. Lycurgus was of the opinion that "children were not so much the property of their parents as of the Commonwealth." The father and mother did not have it within their power to bring up or dispose of their children as they saw fit. When a baby was born the father was required to bring it before a tribunal, who viewed the infant. "If found stout and well made, they gave orders for its rearing and allotted to it a share of the land. If found puny and ill shaped it was put away, as think-

ing it neither for the good of the child nor for the public interest that it should be brought up if it were not healthy."

Swaddling bands were not allowed, the children growing up unrestrained in limb and form. Children were not allowed to be dainty or fanciful about their food, or to be afraid of the dark and if left alone. Spartan nurses were so well trained in these methods that they were often bought or hired by people of other nations. Fathers were not allowed to bring up their children after any ideas of their own. As soon as the child was seven years old it was enrolled in certain classes where the children all lived under the same order and discipline. All children were required to wear very little clothing and to sleep out-of-doors on rough beds of grasses. It is interesting to note this prototype of our present recognition of the value of outdoor sleeping and the use of light-weight clothing for children.

No other early account that we have in regard to the relation of the state to the child is as complete as that of Lycurgus, but we are able to trace certain isolated instances of more or less primitive child-welfare legislation, and in all such instances the care of the child is based upon its value to the state. As an instance of this, Plato required a physical examination of all men and women before marriage, and possibly the first single law for child welfare that we can find recorded is that of Babylon in 2800 B.C. This law established the principle of pensions for widows or deserted mothers.

The influence of war on the relation of the state to the child is shown all through history. Lycurgus' efforts to promote normal and healthy childhood were founded upon his desire to protect the state by having all citizens fit to take their part in its defense. Probably the first definite recognition of this relation is shown by the account of Romulus when he became the founder of Rome in the eighth century B.C. His predominant desire was to protect his state from hostile invasion, therefore his first concern was a strong nation. A strong nation from his point of view meant as

many adult males in good health and normal physical condition as possible. He considered soldiers as of more importance than any other human beings. He required a pledge from all citizens to bring up all male children except those that were lame or deformed, and to bring up the first-born female children. Before that time Roman fathers had great power over their children. They could sell or mutilate or kill them. These powers were taken away by the action of Romulus. The right of the child to live was recognized by authority for the first time, and here we get our first note of humanity in the relation of the state or the parents to the child.

For a long time after this period the welfare of children was apparently neglected; at least there is little or no record of any direct legislation for their benefit. Later, the humanitarian note again creeps in with the early establishment of foundling asylums for children who have been abandoned by their parents. In A.D. 14 the Emperor Augustus offered a grant of the equivalent of forty dollars to any family who would rear an orphan. During the reign of Constantine in Italy in A.D. 306, the state made definite progress in this direction. Constantine addressed an edict to all cities in Italy, directing that immediate aid be given by the state to parents who gave birth to children, but who were too poor to bring them up, and declared that if the parents could not support a child the treasury should be drawn upon for aid.

To the Roman Catholic Church belongs the credit for making the earliest thorough provision for foundling babies. The first institution of this kind was founded by the Church in Florence, in 1421. About 1638 Vincent de Paul opened a foundling hospital in Paris, which has been considered the forerunner of modern hospitals of this type. In 1737 Datheus, Archbishop of Milan, issued an edict as follows: "Therefore I, Datheus, for the welfare of my soul and the souls of my associates, do hereby establish in the house that I have bought next to the church, a hospital for

foundling children. My wish is that as soon as a child is exposed at the door of a church, that it will be received in the hospital and confided to the care of those who will be paid to look after it. These infants will be taught a trade, and my wish is that when they arrive at the age of eight years they will be free from the shackles of slavery and free to come and go wherever they will." Since that time the establishment of foundling hospitals has been common in all countries, and until the past decade had probably represented the most extensive part of the child-welfare program of any land.

The practice of infanticide of weakly children and of many girl babies is common in the early history of some nations. It is believed that this custom persisted in China longer than in any other country, and many centuries ago the evil was recognized by one of the emperors, Ho Long-Tou, who wrote a book entitled *On Abstaining from Drowning Little Girls.*

With the exception of a very few instances of beneficent legislation, it remains true that the history of child care up to the time of the Christian era was mainly one of oppression. The spiritual awakening due to the teachings of the Jewish prophets, and, later, to those of Jesus and Mohammed, made its imprint upon the succeeding ages, but only lately has it been crystallized into an actual human program.

There are instances of the recognition of the importance of the child from every point of view, such as Socrates' noted appeal to the Senate: "Are you not risking the greatest of your possessions? For children are your riches, and upon their training for well or ill depends the whole order of their father's house." It is only within the past fifty years that the race as a whole has been concerned with the protection of child life. As G. H. Payne, in his comprehensive book *The Child in Human Progress,* has expressed it: "More has been written about the child in the last fifty years than had been written in the world in all civilized times up to the beginning of this half-century." In re-

viewing all history of the care of children, it seems evident that civilization may be measured in its progress by a nation's attitude toward its children.

There can be no question that the concern of the state for children has been, and unfortunately still is to a large extent, dependent upon the need of self-protection and defense against a possibility of armed invasion. War has been the greatest stimulus to organized efforts for child care. War and childhood should be the very antithesis of each other, but it is impossible to study the history of child welfare from its earliest conception without recognizing that war or the thought of war has stimulated the majority of countries to the needful protection of child life. Even during the last century this is strikingly evident.

France has given the earliest instance of a modern child-hygiene program. Indeed, we have hardly a single type of child-hygiene work that did not originate in that country. France had the first organized foundling asylums; the *crèche,* or day nursery, is a direct contribution from that country. France passed the first laws for the protection of illegitimate children and the provision for pensions for mothers. The first infants' milk stations were organized in France, and school medical inspection had its beginning there about the middle of the last century. It would be difficult to ascribe an altruistic motive for that country's extended program for child hygiene. For generations France has faced a declining birth rate and a fairly high infant mortality rate. She has also faced, and is facing to-day, what seems to her the menace of her frontier. Her whole history is bound up with the thought of protecting the nation against armed invasion and of maintaining a standing army large enough for that purpose, should the need arise. Her early interest in child welfare was a manifestation of this spirit. It is in no sense derogatory to France to mention this, because it is equally true of practically every other nation. Germany's widespread child-welfare program and its legislation for the protection of child life have perhaps been more

outspokenly based upon this idea than that of other countries. The era of "blood and iron" and the preparation for world conquest included the building up of a physically sound citizenry, and part of the preparation for war was adequate protection of child life.

England made no preparation for a child-hygiene program until the Boer War occurred. The high percentage of physical defects found in the enlisted or drafted men at the time of the Boer War shocked the health authorities and other interested persons in England, and as a result that country started its system of school medical inspection.

The effect of the recent World War in stimulating health work for children is well summed up by Emma Duke, statistical expert of the Children's Bureau, who stated in an address made in 1918 that "the great loss of life in this disastrous war has so thoroughly aroused public interest in the subject in Europe that one of the war economies most prominently urged and generally accepted there is economy in babies.

"Few Europeans to-day discount the value of war equipment, yet England's practical men and women are urging that 'babies are of greater import than battalions and truer dreadnaughts.' Germany designates its present reinvigorated efforts for the conservation of infant life as 'movements of increasing and improving national efficiency.' France tells her citizens that the combat against such of their enemies at home as alcoholism, tuberculosis, and infant mortality is of pressing import and of vital necessity, and that infant mortality is now a problem of the life and death of the nation and all other problems are secondary.

"These countries, and even Belgium with all her burdens, and the small neutral countries divert attention from details of fighting and appeal to patriotism in language that every one understands. Dr. Louis C. Parkes, before the Royal Sanitary Institute, estimated that two years of war cost the five principal belligerent nations (England, France, Russia, Germany, and Austria-Hungary) nine millions of

males of military age. Adding losses sustained by other countries, he brings the total up to twenty millions. The people in Europe are told to 'Make up for the terrible wastage of war by conserving all the young life possible'; that 'The child should have a fair start in life and arrive at maturity physically fit to take his part in the heritage of the Empire'; 'The nation needs men, more men, still more men, and the child is father to the man'; 'The nation survives in its young.' "

The experience of the United States in this regard is so recent as to be well known to everyone. Notwithstanding our extraordinary progress as a nation, little or no attention had been paid to child welfare until less than twenty years ago. Up to the time of our entry into the World War five states had recognized their responsibility in this regard by organizing divisions of child hygiene. Within five years after the termination of the war forty-three states had organized similar divisions, and practically every city in the country, and many rural communities, had adopted similar programs.

The two reasons for this remarkable progress in the United States are not difficult to find. First was the fact that as soon as the recent war started, the appeal from the belligerent countries was forcefully brought to the attention of every man and woman in this country. The neutrality of the United States forbade any direct assistance to the fighting forces other than that which fell within the limits of purely humanitarian aid. This latter first found expression in the formation of various hospital and ambulance units and the activities of the several large national welfare organizations. A large number of our people were enlisted in the army of direct service, but a far larger number were called upon with the humanitarian appeal for aid for the countries which were suffering from invasion. One of the earliest of these appeals came from Belgium. It was based mainly upon the need of protection for the child life of that country. Later the same appeal came from France.

Without discounting the efforts for rehabilitation of the population of those countries who had lived in areas devastated by the war, we know that the main appeal from every country in Europe was at that time, and in many countries still is, the appeal for help for the children. The services of many persons were enlisted and vast sums of money have gone from this country for helping the children of Europe.

The second reason is that we repeated the experience of England in the Boer War, in our astonishment and dismay over the draft figures relating to physical incapacity, for over one-third of our young men between the ages of twenty-one and thirty-one years were handicapped by one or more physical defects, which in nearly every instance could have been prevented, and which were of the type which could be traced back in their inception to the period of childhood. These two factors were the stimulus needed to give us our present nation-wide child-hygiene movement. The vast bodies of organized effort in this country, particularly the national organizations of women, after their interest had been aroused by the conditions surrounding the children of other nations, found themselves inquiring into conditions of child welfare in the United States. The passage of the Sheppard-Towner Act was the logical result of this.

It is easy to believe that we might have made this progress unaided by any such stimulus, but no one could have been close to the evolution of child health work in the United States and not have recognized its difficult and halting progress, its lack of public support, and its indifferent results before the war, and the remarkable progress and rapid extension of child-hygiene programs since the country felt the stimulating effect of this by-product of war and its clear psychological reaction. The United States did not undertake child-welfare work because of the need of maintaining a standing army or from fear of armed invasion, but its attention was called to the need for child protection and health care by the same basic stimulus that gave Europe its

impetus in the last century and that may be traced as the reason for child protection throughout all recorded history.

The Relation of the State to the Child in Modern Times.—Legislation with relation to the child welfare is commonly accepted by all civilized nations of the world to-day. In Europe the problem has been a simpler one because, owing to the form of government followed by practically every nation, it has been possible to enact child-welfare legislation that would affect every part of the particular country. The principles of legislation of this type in Europe have generally been founded upon (a) central programs and financial support, (b) the co-ordination of local programs and provision for local expenditure to match in part or as a whole the appropriation of the central government. England's maternity and infancy act is not only one of the best-known pieces of legislation of this type, but is probably the most complete in its form and the most efficiently administered. All other child-welfare legislation in European countries is founded upon this same idea of uniformity in administration throughout the country that is concerned. Such legislation may refer to mothers' pensions, aid for neglected children, establishment of institutions for children, or matters involved in child hygiene proper.

In the United States because of our state as well as federal government, conditions in regard to child-welfare or child-hygiene legislation are more difficult of description. The beginning of child-welfare legislation in the United States was the act passed by the New York State legislature in 1876 granting to the Society for Prevention of Cruelty to Children a charter giving it wide power with regard to the protection of child life. The inception of this legislation was based upon the well-known case of "Mary Ellen," a child who was found in filthy surroundings, neglected and abused. When it was known that a society for prevention of cruelty to animals already existed and could have cared for an animal who was found in the same unfortunate con-

dition, it was determined that children should have at least equal protection.

From this simple beginning has arisen in this country the whole mass of child-welfare laws. These laws relate to every possible type of child welfare, and only a small number of them are of immediate concern to the question of child hygiene. It is of interest to know, however, that these laws rest basicly upon the proposition that all parents must provide food, shelter, medical attendance, and decent care for their minor children, and that if they fail to do so the state has a right to take the child from its parents and assume the guardianship. This idea has been extended until it has been held to include the essential legislation needed for the care of infants and young children, school medical inspection, and the broad laws for the protection of child life, such as the widows' pension act, child labor laws, and the mass of legislation having to do with the truant, delinquent, neglected, or illegitimate child.

As a part of our newly stimulated interest in child welfare we have discovered that the laws of various states, as far as they relate to the protection of child life, have been for the most part ill-considered, in some instances ambiguous, and in nearly all cases of doubtful efficiency in their enactment. To remedy this condition, the Governor of Ohio in 1911 appointed a Children's Code Commission. Its function was to investigate existing institutions for child care and to study, revise, and codify the laws relating to children. The effect of this act was far-reaching. In 1913 New Hampshire and Oregon appointed similar commissions. Missouri's commission was appointed in 1915, and in 1916 Minnesota established a Children's Code Commission which was to prove of extended influence. The code adopted by Minnesota is modeled largely upon the Norwegian code and probably provides a better system for safeguarding the safety and rights of the child and for the protection of babies born out of wedlock than does any other code or the system of laws in any of the other states.

Other children's code commissions were established in the following order: 1917—Michigan and Montana; 1918—Delaware, Kansas, and Wisconsin; 1919—Connecticut, Indiana, Nebraska, Oklahoma, South Carolina, South Dakota, Texas, and Utah; 1920—Kentucky, New York, and Tennesse; 1921—District of Columbia, North Dakota, Virginia, and West Virginia; 1922—Georgia; 1923—Florida, Iowa, Maryland, and Pennsylvania.

The work of these commissions has proved the necessity for this codification and readjustment of the present laws and for the enactment of additional laws for the conservation and protection of child life. The administrative work of these commissions is described in a pamphlet issued by the United States Children's Bureau, entitled, "State Commissions for the Study and Revision of Child Welfare Laws."

National legislation for child welfare in the United States has been slow. The federal government has been hesitant in assuming responsibility for welfare legislation, and it has been considered as primarily the business of the individual states. Within recent years, however, there has been a marked change in the attitude of Congress with regard to this type of legislation. This has been manifested, as far as child welfare is concerned, in the passing of two acts of great significance.

A federal child labor law was passed on September 1, 1916, to become effective one year later. This law forbade the transportation in interstate or foreign commerce of products of mines, quarries, or of manufacturing establishments violating the following standards:

(a) The prohibition of the labor of children under sixteen years of age in and about mines and quarries.
(b) The prohibition of the labor of children under fourteen years of age in mills, canneries, workshops, factories, and manufacturing establishments.
(c) The limitation of the labor of children from fourteen to sixteen years of age in manufacturing estab-

lishments to eight hours a day, six days a week, and to daylight hours between 6 A.M. and 7 P.M.

This law was held unconstitutional by the United States Supreme Court by a vote of five to four on June 3, 1918, on the ground that the power of Congress to regulate interstate commerce does not include the power to prohibit the movement of ordinary commercial commodities for the purpose of regulating child labor which comes under state authority.

The second federal child labor law (the Child Labor Tax Act) was passed by Congress on February 24, 1919, and became effective May 25, 1919. The act imposed a tax upon the net profits of mines, quarries, or manufacturing establishments violating the standards outlined above. This law was held unconstitutional by the United States Supreme Court by a vote of eight to one on May 15, 1922, on the ground that it was not a proper use of the power of Congress, but an attempt to impose, through taxation, certain standards as to employment of labor, the regulation of which belongs to the state.

The fact that neither of these laws has come within constitutional limits led to a movement for a constitutional amendment giving the Congress the power to regulate child labor.

Such an amendment was passed by the Senate on June 2d., 1924. The resolution as passed is as follows:

Section 1. The Congress shall have the power to limit, regulate, and prohibit the labor of persons under eighteen years of age.

Section 2. The power of the several states is unimpaired by this article except that the operation of state laws shall be suspended to the extent necessary to give effect to legislation enacted by the Congress.

This amendment, having been previously passed by the House of Representatives, has now been submitted to the state legislatures for ratification.

The significant feature of this proposed amendment to

the Constitution is that it will be the first part of that document which relates solely to the rights of childhood and the protection of child welfare. The importance of this as a recognition of the relation of the state to the child cannot be overestimated. It marks an epoch.

The second nation-wide legislation is "the Act for the Promotion of the Welfare of Maternity and Infancy," or what is popularly known as the "Sheppard-Towner bill." This act, modeled closely upon England's Maternity Act, is based upon the appropriation by the federal Government of sums of money annually to each state on the basis of the population of the state, this appropriation to become effective only when the state has itself appropriated an equal sum of money. The act was introduced into the 65th Congress by Congressman Jeanette Rankin. It was reported out of the committee, favorably but failed to pass. A second bill was introduced in the 66th Congress. This passed the Senate and, after adoption of many amendments, was favorably reported upon by the House Committee on Interstate and Foreign Commerce. This action, however, was taken so late in the session of Congress that it was not considered by the House as a whole.

In the first session of the 67th Congress the bill was again introduced by Senator Sheppard and Congressman Towner, was finally passed on November 21, 1921, and was signed by President Harding on November 23, 1921. The funds for the administration of the act did not become available until April, 1922.

The precedents for the Sheppard-Towner Act were many. The granting of aid by the Congress to the states has existed from 1785, or before the Constitution was adopted. In many instances, mainly those in the early part of the nineteenth century, money was given outright for general or specific purposes, to further education, for roads, bridges, canals, and other internal improvements. In 1862 the Morrill Act was passed. Under this act public lands were granted to the states, the proceeds from the sale of which

were to become perpetual funds, the interest to be used to develop education, agriculture, and the mechanical arts. Certain requirements were specified to be carried out by the states. In 1914 Congress passed the Smith-Lever Act providing for agricultural extension work in connection with agricultural colleges. Permanent annual appropriations and additional appropriations contingent upon equal appropriations by the states were provided for. In 1917 Congress passed the Smith-Hughes Act to aid the states in promoting vocational education. This act is conditional upon the agreement of the states to match the federal allotment dollar for dollar.

The main features of the Sheppard-Towner Act are (1) federal financial aid to the states, this aid to be matched in part by the states; (2) the administration of this aid by the Children's Bureau of the United States Department of Labor, acting under the federal board of maternity and infant hygiene, composed of the chief of the Children's Bureau as chairman, the surgeon-general of the United States Public Health Service, and the United States Commissioner of Education; (3) the application of such aid to the problem of reducing maternal and infant mortality and protecting the health of mothers and babies; and (4) the vesting in the states of complete authority to initiate and to administer plans, subject to approval by the board of maternity and infant hygiene.

The funds available to the states under the appropriations are (1) a direct grant of $5,000 to each state accepting the provisions of the act; (2) an additional sum of $1,000,000 for each fiscal year, with the provision that not more than 5 per cent shall be used for the expense of federal administration, the balance to be apportioned to the states and granted, if matched dollar for dollar by the state appropriations, on the basis of an additional $5,000 to each state and the remainder pro-rated to the states on the basis of population.

During the first year—1922—forty-two states accepted

the provisions of the act, twelve by legislative enactment and thirty through the approval of the governor pending the next regular meeting of the state legislature. Of the six states not co-operating in 1922, and during the first half of the fiscal year 1923, the legislatures of Louisiana, Massachusetts, and Rhode Island met and did not accept. During the second fiscal year ending June 30, 1923, forty states accepted the terms of the act. The eight states that are still not co-operating and have not accepted any federal funds are Connecticut, Illinois, Kansas, Louisiana, Maine, Massachusetts, Rhode Island, and Vermont. The benefits of the act were extended to Hawaii on March 10, 1924.

The administration of the provisions of this act in the states has been mainly dependent upon the size of the appropriation and the extent of the territory to be covered. It is interesting to note in this connection that while the act makes no mention of any discrimination in the expenditure of the allotted funds, there has been a tendency throughout the country to concentrate upon rural problems in the care of mothers and children rather than to make expenditures in the larger cities. Such a course meets a hitherto unfilled need, for practically all of the larger cities are now carrying on some form of maternal and infant welfare work by virtue of their own appropriations. The county as a unit for this health work is being adopted by an increasing number of states. In many states the federal and state funds are used in matching county appropriations, the money being usually applied for the furtherance of county public-health nursing.

The Sheppard-Towner bill also marks an epoch in child-welfare legislation in the United States. Unlike the child-labor legislation, it has been held to be constitutional. In 1922 an action was brought before the Supreme Court by the State of Massachusetts upon the premise that the act was "an incursion into the field of the local police power reserved to the states by the Tenth Amendment to the Constitution." Massachusetts further claimed that as the money

MAXIMUM AMOUNTS AVAILABLE TO THE STATES FOR THE FISCAL YEAR ENDING JUNE 30, 1925, UNDER THE PROVISIONS OF THE SHEPPARD-TOWNER ACT

State	Granted outright	Granted if matched			Total
		$5,000 to each	Apportioned on basis of population	Total (if matched)	
Total	$240,000.00	$240,000.00	$710,000.00	$950,000.00	$1,190,000.00
Alabama	5,000.00	5,000.00	15,836.95	20,836.95	25,836.95
Arizona	5,000.00	5,000.00	2,253.71	7,253.71	12,253.71
Arkansas	5,000.00	5,000.00	11,817.51	16,817.51	21,817.51
California	5,000.00	5,000.00	23,112.01	28,112.01	33,112.01
Colorado	5,000.00	5,000.00	6,337.20	11,337.20	16,337.20
Connecticut	5,000.00	5,000.00	9,311.48	14,311.48	19,311.48
Delaware	5,000.00	5,000.00	1,504.01	6,504.01	11,504.01
Florida	5,000.00	5,000.00	6,531.72	11,531.72	16,531.72
Georgia	5,000.00	5,000.00	19,530.55	24,530.55	29,530.55
Idaho	5,000.00	5,000.00	2,912.66	7,912.66	12,912.66
Illinois	5,000.00	5,000.00	43,739.10	48,739.10	53,739.10
Indiana	5,000.00	5,000.00	19,763.62	24,763.62	29,763.62
Iowa	5,000.00	5,000.00	16,313.60	21,213.60	26,213.60
Kansas	5,000.00	5,000.00	11,932.52	16,932.52	21,932.52
Kentucky	5,000.00	5,000.00	16,298.64	21,298.64	26,298.64
Louisiana	5,000.00	5,000.00	12,129.80	17,129.80	22,129.80
Maine	5,000.00	5,000.00	5,179.77	10,179.77	15,179.77
Maryland	5,000.00	5,000.00	9,777.05	14,777.05	19,777.05
Massachusetts	5,000.00	5,000.00	25,981.70	30,981.70	35,981.70
Michigan	5,000.00	5,000.00	24,741.11	29,741.11	34,741.11
Minnesota	5,000.00	5,000.00	16,099.65	21,099.65	26,099.65
Mississippi	5,000.00	5,000.00	12,076.58	17,076.58	22,076.58
Missouri	5,000.00	5,000.00	22,958.19	27,958.19	32,958.19
Montana	5,000.00	5,000.00	3,701.91	8,701.91	13,701.91
Nebraska	5,000.00	5,000.00	8,743.21	13,743.21	18,743.21
Nevada	5,000.00	5,000.00	522.06	5,522.06	10,522.06
New Hampshire	5,000.00	5,000.00	2,988.31	7,988.31	12,988.31
New Jersey	5,000.00	5,000.00	21,284.55	26,284.55	31,284.55
New Mexico	5,000.00	5,000.00	2,430.33	7,430.33	12,430.33
New York	5,000.00	5,000.00	70,041.78	75,041.78	80,041.78
North Carolina	5,000.00	5,000.00	17,259.66	22,259.66	27,259.66
North Dakota	5,000.00	5,000.00	4,362.74	9,362.74	14,362.74
Ohio	5,000.00	5,000.00	38,843.46	43,843.46	48,843.46
Oklahoma	5,000.00	5,000.00	13,679.48	18,679.48	23,679.48
Oregon	5,000.00	5,000.00	5,283.46	10,283.46	15,283.46
Pennsylvania	5,000.00	5,000.00	58,810.99	62,810.99	68,810.99
Rhode Island	5,000.00	5,000.00	4,076.28	9,076.28	14,076.28
South Carolina	5,000.00	5,000.00	11,355.65	16,355.65	21,355.65
South Dakota	5,000.00	5,000.00	4,293.11	9,293.11	14,293.11
Tennessee	5,000.00	5,000.00	15,767.55	20,767.55	25,767.55
Texas	5,000.00	5,000.00	31,450.52	36,450.52	41,450.52
Utah	5,000.00	5,000.00	3,030.89	8,030.89	13,030.89
Vermont	5,000.00	5,000.00	2,376.90	7,376.90	12,376.90
Virginia	5,000.00	5,000.00	15,574.00	20,574.00	25,574.00
Washington	5,000.00	5,000.00	9,149.55	14,149.55	19,149.55
West Virginia	5,000.00	5,000.00	9,871.74	14,871.74	19,871.74
Wisconsin	5,000.00	5,000.00	17,751.62	22,751.62	27,751.62
Wyoming	5,000.00	5,000.00	1,311.12	6,311.12	11,311.12

[1] The act also makes available to the Children's Bureau not to exceed $50,000 for administering its provisions.

appropriated was to be "illegally divided among the states accepting the act," the property rights of the citizens of

Massachusetts who were federal taxpayers were involved and the Commonwealth could find a basis for a suit for protection of the property rights and welfare of its citizens as well as the defense of its rights as a sovereign state. This action was started in October, 1922. In December, 1922, a taxpayer's suit was started containing substantially the same allegations as the Massachusetts suit, with the additional statement that "appropriations unauthorized by the Constitution of the United States, resulting in the taxing of her [plaintiff's] property without due process of law, was in violation of the Fifth Amendment to the Constitution." On June 4, 1923, the United States Supreme Court rendered an unanimous decision that both of these cases must be disposed of for want of jurisdiction.

The widespread and effective work of the United States Public Health Service for the welfare of children is carried on by virtue of the general powers of that service rather than by direct legislative enactment. This work, which is mainly concerned with older children, particularly those of school age, will be referred to in the discussion of special phases of child hygiene. Reference should be made here, however, to the extensive studies that have been made by the Service and the practical aid that has been given to the states, in co-operation with the state governments.

The United States Bureau of Education has also contributed to a definite extent in the line of health education in the schools. In this it had the co-operation of the Child Health Organization and much valuable literature on this subject has been distributed. This work is carried on by virtue of the general powers of the Bureau, and not by special act of Congress.

State Legislation for Child Hygiene.—Other types of legislation for child hygiene belong to the individual states. These will be discussed under the appropriate divisions of the work. In general, these state laws are those that relate to (1) control of the practice of midwifery, (2) supervision of day nurseries, (3) supervision of infants in insti-

tutions and those who are boarded out with foster-parents, (4) school medical inspection, (5) child labor with particular reference to the health of the children applying for employment certificates and those who are employed in any form of industry for gain, and (6) other laws relating to the general welfare and health of children. A large part of this legislation is of comparatively recent inception and its present wide extent is an indication of the remarkable development of child hygiene in this country.

The Home and the Child.—Marriage, both as a religious sacrament and as a civil act, was instituted because of its relation to the bearing and rearing of children. Monogamy was also instituted to safeguard the rights of children. Children born out of wedlock have always suffered from the taint of so-called "illegitimacy." The illogical attitude which places this burden upon the child rather than upon the parents is hard to understand, and even more difficult to view with equanimity. This question will be referred to later, but it should be mentioned in this connection because of the inference it bears that a child who has not the background of a normal home, with parents who have been legally married, is an outcast from society. In that interesting book, *The Family,* by Elsie Clews Parsons, will be found an account of the origin and the development of the idea that the home rests basicly upon the rights of the child. In fact, in all recorded history the child is the incentive of the home, and there have been countless contributions to our knowledge of this relationship.

John Locke's *Essay on Education,* written in the seventeenth century, contains an interesting discussion of the health care of the child in the home. This delightful and diverting dissertation may well make us feel that much of our progress in the intimate details of child hygiene has been in methods of application rather than in increase of knowledge.

The two factors that make us what we are are heredity and environment. Heredity, involving as it does the inherent

traits we possess which have come to us from our forbears, is still a debatable question, not as to its importance, but as to the relative degree in which it influences or shapes our character and individuality. One must be hesitant in pronouncing any final opinion upon the subject, which is far from determined. We may accept with a reasonable degree of assurance that body of accumulated knowledge which tells us that race and physical traits and characteristics are the results of direct inheritance; that mental defect is handed down from one generation to another; and that susceptibility to certain diseases, if not the diseases themselves, may be considered as capable of transmission from fathers and mothers to their children. We may also accept with possibly some degree of reservation the dictum that *inherent* traits may be inherited, but that acquired characteristics, whether mental or physical, cannot be. This point of view is being challenged in some of the later studies on this subject, but, however the decision may lie, it seems evident that environment, which begins where inheritance leaves off—that is, at the instant of conception—can have more influence upon our lives than any type of inherited qualities.

All inherited traits, whether mental or physical, can be accentuated, altered, controlled, and sometimes definitely eliminated by environment. Eugenics—the breeding of a better race—is a subject of such vast importance that one may not belittle or disregard it. It is, however, essentially complex, and to a very great extent the guiding of the destiny of our children, as far as inheritance is concerned, is a matter which is only partially within the control of any individual. Sound physical and mental health should be considered a prerequisite to child-bearing. Proper mating to produce a dominant strain of the right physical and mental characteristics in the offspring is eminently desirable. But even if we were able to choose the ideal conditions in these respects—and of course we are not, except in isolated cases—we must still face the necessity of accentuating the right kind of environment. In our world of to-day,

and indeed for more generations in the past than we can rightly estimate, marriage has not been founded upon these principles. The selective process which leads up to it does not rest upon anything so impersonal as the improvement of the race, nor is it at all probable that we shall so alter our manners and customs as to place marriage upon such a foundation within any future that we can visualize. Indeed, one may doubt whether such a strictly utilitarian basis would, on the whole, be productive of more genuine benefit to the race than our present methods.

Our relation to the child, therefore, is largely one of shaping his environment. The home, with all that it implies, holds within itself the environmental conditions which tend to influence most strongly the general physical and mental status of the child and all that concerns him. It may be summed up in a word—individuality. It may be inferred that child hygiene does not necessarily include character development, and, indeed, the relation of the home to the child from the point of view of character development might well include a consideration that must be as varied and lengthy as any we might give to the question of health in childhood. But any consideration that we may give to child health and the relation of the home to its development and maintenance must necessarily include a reference to character development. In health development as well as in character formation, the first seven years of life, including the prenatal period, are the most important.

From the moment the child is conceived until he is born, his environment is his mother, and the relation between the two is physical. At this time the provision of proper nourishment for the embryonic child is the most important thing that we can plan for his future well-being. From the moment of birth his world is extended and his environment includes everything that affects life as a whole, but it is important to remember that environment affects us in inverse proportion to our age. The education, the training, and the character development of the child begins at the moment

of birth. The formation of habits and tendencies comes long before the child has any consciousness of them. Throughout infancy and early childhood the home represents the world to the growing child. His standards will be affected by the standards of his home life. His health will be determined largely by the health care and the health education he receives during this period. That often-repeated quotation credited to Cardinal Newman: "Give me a child until he is seven and I care not who has him afterward," is so true that it seems incredible that we have not acted more definitely on it.

Neither wealth nor poverty is required to make the ideal home. One is tempted to say that a child may develop into a most desirable type of individual in spite of either. History is full of the accounts of men and women of great genius who have risen from humble surroundings. We have become familiar enough with the idea that great wealth may breed ineffectiveness in the next generation, and one cannot generalize upon such a large subject. The truth would seem to be that it is neither wealth nor poverty, but rather the intelligent direction of either, that gives us our ideal surroundings in the home.

From the health point of view, proper sanitation, decent living conditions, and the essential hygiene that makes for physical well-being should be a part of the child's earliest surroundings and influence the formation of his health habits. We know that over one-third of all of the infant deaths that occur during the first year of life take place during the first month and that these are dependent upon conditions affecting the health of the mother during the prenatal period. In other words, these babies die because their mothers have not been able to give them health and vitality enough to win out in the struggle for existence. Of the babies who live, many are handicapped by insufficient nourishment during the prenatal period. In China, age is computed not from the date of birth, but from the day of conception. The first birthday comes when the child

is born and the second a year afterward. Such a method might well enter into our attitude toward the health of the child, for the prenatal period is not only the time of greatest danger as far as his chance of existing at all is concerned, but it also has within it the possibility of making a lasting impression, whether for good or ill, upon his physical welfare for his entire life, however long it may be.

If, then, the prenatal period is of such great importance in relation to health, we may perhaps the more readily understand why the first year of life is the next most important period to consider. Not only must the home conform to the highest type of sanitary and hygienic requirements, but it must also provide for the child those physical, mental, and cultural surroundings that make for the best type of development along these lines. So intimate and close is this relation and so easily is the child affected by his immediate surroundings, that serious cases of malnutrition may depend for their beginning and continuance not upon lack of proper food, but because the family, whether rich or poor, are quarrelsome and irritable. The basis for our great national disease—neurasthenia—is laid in early childhood. The school of psycho-analysts have recognized this and have made an important contribution to character and health development by their insistence upon the right type of child training and care. Not only do the early material surroundings affect the health of the child, but also those more elusive matters that pertain to calmness, dignity, and balance, as opposed to irritability, shiftlessness, and lack of responsibility. So our ideal home for the child must have within itself the material and spiritual environmental conditions that make for sound physical and mental health. Happily these are within reach of all. It does not take money to give a child a good home, but it does take intelligence and the desire that comes from understanding. The future welfare of children is bound up with their home life, and no home can justify itself unless it lives up to the highest ideal in this respect.

Responsibility of Parenthood.—Closely allied to the question of the relation of the home to the child comes the relation of the parents to the child. It may almost be considered as being the same thing, and, indeed, in its ethical significance it cannot be separated, but from the legal point of view the responsibilities of parenthood have been placed upon a more definite and concrete basis than we may be able to determine in the case of the home. There is no civilized country in the world to-day that does not have in either its common or its statutory laws a provision whereby parents are required to furnish food, clothing, shelter, and medical attendance to their minor children. It is an indication of the advance of our responsibility toward child life that nearly all countries now provide that parents may not neglect their children or be cruel to them. Society as a whole has altered its attitude toward child labor and toward the cruelty that was formerly encountered in many institutions for children and in many schools. Associations for the prevention of cruelty to children, or their prototypes, exist practically everywhere.

There has been a tendency in later years, particularly since women have acquired the right of franchise, to place the legal responsibility of parenthood equally upon father and mother. The Norwegian law and the Children's Code of Minnesota both recognize the claim of the so-called "illegitimate child" to the name and property of his father. There are still countries in Europe whose laws give the father full control over the destiny of his children, but such laws are becoming obsolete so rapidly that we need do no more than refer to them. As women are more and more becoming an integral part of their communities and acquiring the rights of citizenship, the laws relating to the parental responsibilities to children are being changed so that fathers and mothers have an equal share in the control and care of their children. There are, however, certain divisions in this control that still exist. It is generally conceded that it is the father's duty to provide the material

support for his children. He is required to make adequate provision for their physical surroundings. It is his duty to see that they get food, clothing, shelter, and medical attendance. The mother is not given this same responsibility, as a rule. Her relation to her children has a more intimate and personal and less material side. She is expected to bring them up and care for them, and has been told through countless generations that this is her business. All books and other writings on child care have been directed at her. If one depended upon the literature on child hygiene as a basis for drawing conclusions, it would be easy to believe that the child had only one parent, and that parent was his mother. It is possibly because we think she has more leisure to devote to these more social questions and to the matters that more intimately concern health and welfare that we place it as her business to see that her children are properly brought up. It might be well if all instructions on child care were issued to fathers and mothers instead of to mothers alone. There can be no division of the responsibilities of parenthood. Both mothers and fathers must make use of all measures for the care of their children. Both fathers and mothers must see that the child receives proper protection and has health care in the home, and both fathers and mothers are responsible in an equal degree for the future health and welfare of their children. Therefore, both fathers and mothers need to be intelligent and informed about the type of care that is required.

The responsibilities of parenthood are greater in the human relationship than in any other species. We may revert for a moment to the common habit of considering the mother responsible for the destiny and care of her young. Human mothers have replaced instinct by so-called "intelligence," and therefore they are the only mothers of any species of animal life that do not know instinctively how to care for their offspring. They have to be taught, and each generation and each individual mother has to be taught over again. She does not inherit this knowledge; she does

not instinctively possess it. She is the only mother of any species that must acquire this information before she can use it. Certainly the human baby is the most helpless of the young of any species, and his period of helplessness lasts longer. He is, in fact, the most helpless creature on earth. He has no instinct to guide him to self-care. Unlike the puppy or the kitten, he cannot shift for himself. He depends entirely and absolutely upon the care that is given him. His destiny is in the hands of those who bore him and it will depend upon the care that they give him. Taking these two factors into account, we realize the importance of parenthood. Upon these biological facts rests also the development of our methods of child care. Instructions to mothers and fathers in the proper methods of child care, action by the community to prevent children from living in unwholesome surroundings, and the provision of adequate health supervision when they are removed from the influence of the home, are all due to the recognition of these facts.

In May, 1919, the Children's Bureau Conference on Child Welfare Standards was called by the Secretary of Labor, at the request of the President of the United States. The purpose of the undertaking was "to formulate and to publish standards for the better protection of the children of America and of the world." Part II of the report of this conference deals with the public protection of the health of mothers and children. The standards given are intended to be taken as a minimum and not in any way limiting the degrees of protection which an advanced state might desire to give its children.

Minimum Standards for Child Health.

Maternity.

1. Maternity or prenatal centers, sufficient to provide for all cases not receiving prenatal supervision from private physicians. The work of such a center should include

(a) complete physical examination by physician as early in pregnancy as possible, including examination of heart, lungs, abdomen, and urine, and the taking of blood pressure; internal examination and pelvic measurements before seventh month in primapara; examination

of urine every four weeks during early months, at least every two weeks after sixth month, and more frequently if indicated; Wassermann test when indicated;

(b) instruction in hygiene of maternity and supervision throughout pregnancy, through at least monthly visits to a maternity center until the end of the sixth month, and every two weeks thereafter. Literature to be given to mother to acquaint her with the principles of infant hygiene;

(c) employment of sufficient number of public-health nurses to do home visiting and to give instructions to expectant mothers in hygiene of pregnancy and early infancy; to make visits and to care for patient in puerperium, and to see that every infant is referred to an infant-welfare center;

(d) confinement at home by a physician or a properly trained and qualified attendant, or in a hospital;

(e) nursing service at home at the time of confinement and during the lying-in period, or hospital care;

(f) daily visits through the first five days and at least two other visits during the second week by physician or nurse from the maternity center;

(g) at least ten days' rest in bed after a normal delivery, with sufficient household service to allow mother to recuperate;

(h) examination by physician before discharging patient, not later than six weeks after delivery.

2. Clinics, such as dental clinics and venereal clinics, for needed treatment during pregnancy.

3. Maternity hospitals, or maternity wards in general hospitals, sufficient to provide care in all complicated cases and for all women wishing hospital care; free or part-payment obstetrical care to be provided in every necessitous case at home or in a hospital.

4. All midwives to be required by law to show adequate training, and to be licensed and supervised.

5. Training and registration of household attendants to care, under the supervision of physicians or public-health nurses, for sickness in the home and for the home during sickness.

6. Education of general public as to problems presented by maternal and infant mortality and their solution.

Infants and Preschool Children.

1. Complete birth registration by adequate legislation requiring reporting within three days after birth.

2. Prevention of infantile blindness by making and enforcing adequate laws for treatment of eyes of every infant at birth and supervision of all positive cases.

3. Sufficient number of children's health centers to give health instruction under medical supervision for all infants and children not under care of private physician, and to give instruction in care and feeding of children to mothers, at least once a month throughout the first year, and at regular intervals throughout preschool age. This center to include a nutrition clinic.

4. Children's health center to provide or to co-operate with a sufficient number of public-health nurses to make home visits to all infants and children of preschool age needing care—one public health nurse for an average population of 2,000. Visits to the home are for the purpose of instructing the mother in

(a) value of breast feeding;

(b) technic of nursing;

(c) technic of bath, sleep, clothing, ventilation, and general care of the baby, with demonstrations;

(d) preparation and technic of artificial feeding;

(e) dietary essentials and selection of food for the infant and for older children;

(f) prevention of disease in children.

5. Dental clinics, eye, ear, nose, and throat clinics, venereal and other clinics for the treatment of defects and disease.

6. Children's hospitals, or beds in general hospitals, or provision for medical and nursing care at home, sufficient to care for all sick infants and young children.

7. State licensing and supervision of all child-caring institutions or homes in which infants or young children are cared for.

8. General educational work in prevention of communicable disease and in hygiene and feeding of infants and young children, including compulsory course in child hygiene in the public schools.

School Children.

1. Proper location, construction, hygiene, and sanitation of schoolhouse; adequate room space—no overcrowding.

2. Adequate playground and recreational facilities, physical training and supervised recreation.

3. Open-air classes and rest periods for pretubercular and certain tuberculous children and children with grave malnutrition. Special classes for children needing some form of special instruction due to physical or mental defect.

4. Full-time school nurse for not more than 1,000 children to give instruction in personal hygiene and diet, to make home visits to advise and instruct mothers in principles of hygiene, nutrition, and selection of family diet, and to take children to clinics with permission of parents.

5. Adequate space and equipment for school medical work and available laboratory service.

6. Part-time physician with one full-time nurse for not more than 2,000 children, or full-time physician with two full-time nurses for 4,000 children for

(a) complete standardized basic physical examinations once a year, with determination of weight and height at beginning and end of each school year. Monthly weighing whenever possible;

(b) continuous health record for each child to be kept on file with other records of the pupil. This should be a continuation of the preschool health record which should accompany the child to school;

(c) special examinations to be made of children referred by teacher or nurse;

(d) supervision to control communicable diseases;

(e) recommendation of treatment for all remediable defects, diseases, deformities, and cases of malnutrition;

(f) follow-up work by nurse to see that physician's recommendations are carried out.

7. Available clinics for dentistry, nose, throat, eye, ear, skin, and orthopedic work, and for free vaccination for smallpox and tyhpoid fever.

8. Nutrition classes for physically subnormal children, and the maintenance of midmorning lunch or a hot noonday meal when necessary.

9. Examination by a psychiatrist of all atypical or retarded children.

10. Education of school child in health essentials.

11. General educational work in health and hygiene, including education of parent and teacher, to secure full co-operation in health program.

Adolescent Children.

1. Complete standardized basic physical examination by physician, including weight and height, at least once a year, and recommendation for necessary treatment to be given at children's health center or school.

2. Clinics for treatment of defects and disease.

3. Supervision and instruction to insure

(a) ample diet, with special attention to growth-producing foods;

(b) sufficient sleep and rest and fresh air;

(c) adequate and suitable clothing;

(d) proper exercise for physical development;

(e) knowledge of sex hygiene and reproduction.

4. Full-time education compulsory to at least sixteen years of age, adapted to meet the needs and interest of the adolescent mind, with vocational guidance and training.

5. Clean, ample recreational opportunities to meet social needs.

6. Legal protection from exploitation, vice, drug habits, etc.

CHAPTER II

THE EVOLUTION OF CHILD HYGIENE

"The public health is the foundation upon which rests the happiness of the people and the welfare of the nation. The care of the public health is the first duty of the statesman."—DISRAELI.

IN order to understand the evolution of the child-hygiene movement in the United States it is necessary to consider the factors that have contributed to its development. We have already mentioned the influences which have acted upon public opinion and that have resulted in the passing of national and state child-hygiene laws and the formation of child-hygiene organizations, both national and local. Public opinion, no matter how extensive or interested, cannot achieve any lasting or effective change either in legislation or methods of procedure unless it is based upon sound and readily applied principles and unless the proper machinery may be readily put into effect to carry out the popular will. This is as true of child hygiene as it is of every other type of effort. Mere sentimentalism, however widespread and appealing it may be, has only a temporary value. The appeal to help children is one that stimulates our best instincts. It always meets with a ready response, but if it is to be worth while in its accomplishments it must be something more than emotional. It is significant that health work for children has had a steady and sound evolution and that the progressive steps in its development have rested upon scientific knowledge. It is also significant that the nation-wide enthusiasm for child welfare came at a time when the evolution of public health, the progress of medical science, and the development of public-health nursing had

all arrived at the point where their main efforts were being directed toward prevention of disease.

Child hygiene as it is carried on to-day is the most important and significant part of any public-health program. Childhood is the time when we may build a lasting foundation for health and all modern methods for disease prevention are based upon this knowledge. The history of child hygiene is the history of the three branches of preventive medicine and every worker in the field of child hygiene should be familiar with the history and evolution of each group.

Child Hygiene and Public Health.—Public health as we know it to-day is of comparatively recent inception. The question of priority among the states in the establishment of the first state department of health probably cannot be determined. Among the earliest were those of New York and Massachusetts. Previous to 1850 there was practically no direct governmental control of public health in this country. In England a beginning in this direction had been made as the result of the publication of the classic work of Doctor Farr. This study, which was based upon the vital statistics of that country, discussed for the first time the relation of disease and death rates to age, nationality, social conditions, sanitary and economic factors, and the various other problems concerned with the distribution and character of the population. The experience of New York City may be taken as an indication of the reaction of this country to this new knowledge and the possibilities of its adaptation to the prevention of disease.

In 1848 the conditions relating to health in New York City were deplorable. Sewage disposal and methods for the removal of garbage and other waste were primitive in the extreme. The death rate was abnormally high. Epidemics of infectious and contagious diseases were common. The larger part of the city was without any provision for a decent or safe water supply. Housing conditions, particularly in the tenement districts, were disgraceful and

the most elementary sanitary laws were not enforced. Quarantine of the city was a not infrequent occurrence, owing to outbreaks of epidemic diseases, particularly cholera. As a result of this quarantine, business was seriously disturbed and the first impetus for a more drastic enforcement of public-health measures came from merchants as a class because of their inability to either send goods out of or to receive them into the city. In 1849 a petition was sent to the state legislature asking for an investigation of the sanitary condition of the city. Space does not permit of any quotations from the report of the legislative inquiry, but the conclusion of the committee from the legislature was that New York City was probably one of the most unhealthful places in the world and that it needed a far-reaching and vigorous cleaning up.

In 1850 the state legislature passed a law creating a Metropolitan Board of Health and conferred upon it the most drastic and extensive powers. Practically all boards of health at the present time have these same powers, which are based upon the dictum of the common law that "the safety of the people is the supreme law of the state" and the use of the "police powers" of the state in enforcing this law. In order that these vast powers should not be conferred upon any one individual, boards of health were created, consisting of several members, with a health officer as the executive member. The powers of the boards of health include the three fundamental branches of all government: (1) legislative—the authority to make any laws that may be necessary to conserve and govern matters of public health; (2) executive—the authority to execute and administer any health or sanitary laws so made; and (3) judicial—the authority to determine the extent and character of any violation of the health and sanitary laws. These health laws are usually comprised in what is called a "sanitary code."

It is difficult for us to realize what enormous power rests in our boards of health. These powers are so drastic that

they include the right to seize any property that may be needed for public-health purposes, to quarantine cities or individuals, and even to take complete control of any person. Illustrations of these latter two powers may be of interest.

The power of quarantine was forcefully shown a few years ago when a mild epidemic of infantile paralysis spread over the country. As an epidemic of disease it did not amount to much, but as an epidemic of fear and dread and hysteria, the effects were widespread. Even the most remote little country town felt the need of self-protection. Although there was little or no scientific basis for the belief that the infection of the disease could be carried from place to place, practically every community of any size in the United States established a quarantine and would not allow children to be taken out of or brought into their limits unless certain formalities were gone through and every possibility of the carrying of infection was eliminated. It was not an uncommon thing for people who were motoring to have their automobile held up by a man with a gun, who searched under the lap robes and in every part of the car to find children who might be concealed. The important thing to us in this relation is that every board of health, no matter how small or seemingly insignificant, had the absolute power to determine who should come into the town or village over which they had jurisdiction in health matters, and moreover, that they were the final authority in this matter.

The second instance of assumption by boards of health of powers over one's liberty is strikingly illustrated by the case of "Typhoid Mary." This woman, who was about forty years of age, had been a cook. Dr. George Soper of New York was called in as an investigator to trace the causes of the occurrence of typhoid fever in a family living in New York City. As part of his investigation he questioned the servants of the family, with particular regard to their previous history. He found that "Mary," the cook, had in the previous three or four years worked for a number

of families in communities in Maine and Long Island, New York, and from each family where she had been employed he received a statement that about three weeks after this cook had commenced to work for the family cases of typhoid fever had developed. The number of these cases ranged from one in some families to ten in others. Mary was removed to one of the hospitals of the health department for observation. It was found that her fæces contained an almost unlimited number of the typhoid bacilli. As far as could be ascertained, she had never had typhoid fever. She was kept isolated in one of the department's hospitals for several years, but was finally allowed out on parole when she promised to report once a month and pledged herself not to take any position which involved the handling of foodstuffs. In about a year's time she ceased to report to the department and was lost sight of. About a year after that an epidemic of typhoid fever broke out in the Sloane Maternity Hospital in New York. Both patients and employees were affected. An investigation by the health department resulted in finding Mary actively engaged in her duties as cook in the institution. She was again taken to one of the hospitals of the health department and lives there to-day and will probably be deprived of her liberty for the rest of her life. This is not the present method of dealing with typhoid carriers, who are now being recognized without difficulty and who are left at liberty under reasonable precautions to prevent their being a menace to the rest of the community.

It is not to be wondered at that the conferring of such broad powers led to their being used, and that the early history of public health in this country is mainly one of repression, with little or no attempt to do anything but enforce the most drastic health laws, with a minimum regard for the individual. The progressive enlightenment of public health authorities is shown by the four phases through which its evolution has been accomplished. These may be called

the restrictive, the repressive, the corrective, and the preventive periods of public-health work.

The *restrictive* type of public-health work was that which has been mentioned. It had to do mainly with the simple exercise of the police powers of boards of health used in enforcing quarantine and crude methods of general sanitation. It dealt little, if at all, with the individual, considering that individual health or disease was a purely personal matter, concerning the patient and his doctor and not the community as a whole. Only when disease became epidemic did the board of health think it within its province to take any action. Then its procedure was drastic and often such an invasion of personal rights as would not be possible at the present time. The second phase occurred about 1870.

This *repressive* period came about as the nature of communicable diseases became better understood. It was no longer thought that infectious diseases were the result of poor plumbing or of insanitary conditions alone, but the knowledge that specific bacteria caused the various types of infectious diseases led inevitably to a more marked attention to the individual who was ill. Sickness was no longer considered a matter resting solely between the patient and the doctor. The way in which infection spread was more clearly recognized and inspectors were sent to visit persons affected with the more common types of contagious diseases for the purpose of enforcing individual quarantine and isolation. Disinfection of the patient and fumigation of his immediate surroundings were considered the most advanced and surest methods of preventing spread of infection. The important thing to remember with regard to these two types of health work is that in no instance did they include any health instruction of the individual or any action for the prevention of or attention to any illness other than that caused by some infection.

The third, or *corrective,* phase came about ten years later. It was still based upon the idea that prevention of the spread of infectious diseases was the main function of health de-

partments, but it included a crude type of health education. The high infant mortality rates began to attract attention and health boards broadened their functions to include the provision of medical treatment for sick babies. The most elementary form of school medical inspection (for contagious diseases only) came into existence. The improvement of the milk supply was seen as an essential part of the public-health program, and a more definite attitude was taken toward the relation of purity of the food supply to good health. There are two important things to note in connection with corrective health work: first, it is still the only type of health activity that is carried on in many places, and in nearly all communities it is the kind of work that is associated in the public mind as being the main business of the public-health authorities; second, it consists in what may be called "after the fact" work and as such has little more than temporary value, even if we can credit it with that much, in its relation to health. "After the fact" work consists in waiting until something has occurred before taking any action—that is, the method of dealing with a contagious disease starts with the report of the case. Not until the board of health has been notified that a case of measles or diphtheria or other contagious disease has occurred does it do anything concerning it. When the report is received an inspector or nurse is sent to visit the patient, enforce isolation, and warn the family of the probable punishment if the quarantine laws are violated. If a manufacturer allows the chimney of his factory to smoke or if his machinery makes a noise loud enough to disturb the peace and quiet of the neighborhood, if an individual lives in a filthy manner or allows refuse to collect about his premises, he is told that he must correct this condition or he will be punished as having violated a sanitary law. Such a corrective type of health work has little value and is now evolving into the fourth phase.

Preventive public-health work is essentially educational. It began in this country about 1900 and was largely stimu-

lated by the national organizations which had for their purpose the reduction of the death rate from tuberculosis. The first efforts were directed toward the elimination of infection. It was soon found that tuberculosis, in common with every other infectious disease, had its inception in two factors: first, the presence of the germ, and second, the nonresistance of the individual. It seemed a herculean task to eliminate all of the tubercle bacilli. Sera, or vaccines, did not confer the necessary immunity. It was early learned that the resistance of the individual was a factor of great importance and that decent housing, sufficient supply of good milk and good food, an abundance of sunlight and fresh air and freedom from worry, were all necessary to cure the disease or to prevent its occurrence. It was a practical impossibility for the majority of tuberculous victims to follow such an ideal regime. They could not obtain a pure milk supply or decent housing facilities unassisted by the action of the public-health authorities, neither could they have an abundant supply of food or freedom from worry unless their economic condition was adjusted to fit their needs. This called into being the question of improved living conditions and a living wage. The living wage was more difficult to secure than the improved living conditions. The latter were the function of the public-health authorities. In this connection it was also found that one could not impose health upon people. Not only must they have the necessary facilities for keeping health, but they must individually co-operate in gaining health and keeping it. Upon these two basic points our whole fabric of public-health work now rests.

The inevitable result of the recognition of the value of educational and preventive work in public health was a closer study of vital statistics. It was, of course, well known that the highest death rate occurred at the beginning of life. This was felt, however, to be a condition which could not be prevented. The awakening of the public-health authori-

ties to the value of the reduction of the mortality rates, where those rates were highest, was somewhat slow.

The comparative number of deaths at the beginning of life was appalling, and it is difficult to understand how it could have been faced with complacency for so long a time. Of all deaths at all ages, one-fourth, or one out of every four, occurred under the age of one year; one-third, or one of three, occurred under the age of five years. Moreover, it was found that those diseases which might be classified as preventable occurred almost entirely in this young age group. It is still true, as it was then, that over 80 per cent of all deaths from the common contagious diseases occur under five years of age. Statistics of illness from these diseases are more difficult to secure, but from those that have been compiled it is evident that over 90 per cent of all cases of these common contagious diseases occur in this same early period of life. It is also evident that the diseases that were felt to be non-preventable and therefore those over which the health authorities could exercise little control, belonged to the second half of the life period. These were diseases such as cancer and heart and kidney diseases. Tuberculosis was, of course, mainly a disease of young adult life, and it was evident that if the incidence of tuberculosis was to be decreased it would be necessary to see that children were kept in sound health and reached adolescence with sufficient physical resistance to enable them to withstand possible infection.

The age of childhood was found to be the one needing the attention of public-health officials. If the death rate as a whole was or is to be reduced, more extensive efforts were and are necessary in the youngest age groups. It is evident that the preventive part of public-health work, to be effective, must begin at the time of life when habits of health are easily established. The child is plastic material. Prevention of disease and the assurance of good health in childhood are simply and readily secured. With adults, preventive-

health work is difficult. Bad health habits may be corrected, but their effects remain to a great extent.

Evolution of Medical Practice.—During the time the public-health work was finding itself, the practice of medicine was passing through a similar evolution. First, until about the middle of the last century medicine was practiced almost entirely from an empirical point of view. The "gun-shot" prescription—that is, one that contains a great variety of drugs in the hope that at least one of them will be found useful for the cure of the disease from which the patient is suffering—was the common form of medication. Epidemics flourished, death rates were high, the nature of disease was little understood, and medicine was indeed in its swaddling clothes.

The first changes came about with the understanding of the pathology of disease. This led to more accurate dosage of medicine and to more accurate diagnoses. The third phase might be called the bacteriological, and included what is probably the greatest advance that has been made in the science of medicine. The discovery of the specific organisms causing diseases marked an epoch. Bacteriology has inevitably led to the greater development of vaccines and sera for the prevention and treatment of the infectious diseases. It has also contributed in no small degree to the prevention of all diseases and the understanding of the methods whereby this might be achieved. From our point of view, however, the significant thing is that the understanding of the value of bacteriology led also to the knowledge that disease was caused by two factors—the presence of the infectious or exciting agent and the resistance of the individual. A person who is incapable of taking any definite disease is called immune to that disease. This immunity may be natural or acquired. In certain diseases, such as smallpox, typhoid fever, and diphtheria, an acquired immunity which is the result of vaccination or the injection of antitoxins into the blood, is now assured. The greater part of ill health and disease, however, still requires for

its prevention an amount of physical resistance that can be obtained only by the person keeping himself in good health and observing the rules of personal hygiene. In this way the medical profession has, in common with the public-health authorities, arrived at the conclusion that the prevention of disease is essential.

The medical profession seemed slow in recognizing the value of public-health work for children, counting it as a possible infringement upon their professional rights. It has not been uncommon in the past to have groups of physicians protest against any type of treatment for illness that was carried on by public-health authorities, claiming that it was not their function to invade the realm of therapeutics. Protests were received from groups of doctors against any increase in the number of baby health stations, and in some instances against provision of any stations of this type. Health centers, the use of nurses for detecting contagious diseases occurring among school children, physical examination of children in public schools by health and educational department inspectors, the licensing and control of midwives, and many other features of the child-hygiene program have been subjected to a protest from certain sections of the medical profession. To-day, however, the medical profession stands in the front rank of the child-hygiene movement.

Groups of pediatricians, including the leaders as well as more recent graduates, have contributed in large measure the knowledge and technical background upon which our present child-hygiene program is based. Moreover, their co-operation has not stopped when they have contributed to public-health work for children, for the tendency in modern pediatrics is toward accentuating the prevention of disease in those children included in the private practice of the physicians in question. The obstetricians are becoming more and more alert to the necessity for prenatal as well as proper obstetrical care. Whatever opposition may exist at the present time among the medical profession to the

child-hygiene movement is sporadic in its nature and of little importance. The interests of all classes of people who are working for child hygiene are now fused and it is recognized that this program, to be successful, must enlist the aid, interest, and support of physicians, nurses, public-health workers, social workers, parents, teachers, the laity, and, above all, the children themselves. Such support has been crystallized mainly through the efforts of the large national and social organizations of which we have spoken.

Evolution of Nursing.—The evolution of nursing has followed much the same course as the practice of medicine. The earliest record we have of organized nursing is the type of work which was started by Florence Nightingale in the Crimea. This was necessarily hospital work, and under the conditions existing at that time and in that place it was necessarily crude, but far in advance of the "Sairy Gamp" type of nursing. The first differentiation came when nurses began to go into individual homes and to make their choice between private practice and hospital nursing. Later came the third phase, following closely the same trend as medicine. Nurses began to be highly specialized, and this tendency is still strongly evident among nurses in either hospital work or private practice. There are surgical nurses, obstetrical nurses, nurses who devote their time to caring for patients with eye diseases or nose and throat diseases, and so on.

The next marked change in the work of nursing occurred when Miss Lillian D. Wald established on the lower east side of the Borough of Manhattan, New York City, a nurses' settlement. Miss Wald realized that there were many people who needed home nursing rather than hospital care, yet could not pay the amount the nurses found it necessary to charge for their services. The history of the Henry Street Settlement for Nurses is the history of the development of visiting nursing. It soon became evident to these nurses who went into all types of homes to care for the sick that something more was needed to make their work effective. They found it difficult, if not impossible,

to do much to prevent disease or to care satisfactorily for those who were ill in the face of bad living conditions, insufficient food, wrong feeding, and all of the factors which may be summed up in the two words—ignorance and poverty. They, too, felt the need of health teaching, of improvement in sanitation and hygiene, and it was natural, therefore, that Miss Wald should have been the one to suggest the employment of the first public-health nurse in this country. This nurse, who was Miss Lina Rogers, volunteered to aid the Department of Health of New York City in its work of school medical inspection. This occurred in 1902. At that time the Board of Health of New York determined to clean up the schools as far as occurrence of infectious eye and skin diseases was concerned. Doctors were sent into the classrooms to make diagnoses and to exclude from school attendance all children who were found to be suffering from any infectious disease. Trachoma, scabies, ringworm, and pediculosis were encountered so commonly that in some parts of the city practically the entire school population was sent home. The parents felt that the diseases were so insignificant that they refused to take the children to a doctor and let them play on the street untreated. Truant officers ordered the children back to school, only to be met by the Health Department inspectors, who said that the children must stay away until cured. Miss Wald's idea was that possibly these children might be treated in school by a nurse, and if kept under the nurse's observation might be allowed to remain in school without danger of infecting others. Definite types of treatment were adopted, which will be referred to in the chapter on School Medical Inspection. We may only say here that the plan was a complete success and that this type of work has resulted, where it has been followed, in practically eliminating all contagious eye and skin diseases occurring in school children. Our interest now lies in the fact that the first public-health nurse to be employed under governmental control had as the inspiration of her employment the prevention

of diseases among children. The growth of public-health nursing can only be referred to here, but the greater part of the work of public-health nurses is still in the field of child hygiene.

The child-hygiene movement to-day is therefore the outgrowth of the evolution of public health, medicine, and nursing. The three main factors that differentiate it from all other health work are first, *consecutive work*. Child-hygiene work, to be effective, must always consider the child as a child, and not in relation to any one part of its development. No one part of the period of childhood is more important than any other part. Good health during the prenatal period is the best assurance of good health in infancy. Good health in infancy is necessary if the child of preschool age is to combat the dangers of that period. Upon the health of the preschool child will depend largely the health of school age, and the adolescent child will represent the total of health achievement during its whole previous life. Healthy adult life is practically impossible unless based upon healthy childhood, therefore child hygiene work, to be effective, must carry the child through all these periods without a break and with a continuity that assures adequate health protection and health education throughout childhood.

Second, *preventive and educational methods*. In no other part of public health work is there so strong insistence upon the prevention of disease and on health education as in the period of childhood. This is the time when disease can be prevented, when sound health habits can be ingrained, and when future good health can be assured. The child who has learned to keep well, who knows the value of wholesome and healthful surroundings, will naturally retain these health habits when he grows up. They can easily be woven into the fabric of his being, and health can become an unconscious process in later life if child hygiene has received proper attention.

Third, *community and individual activities*. The third point to be considered is the relation of the community to

the child. It is not enough to teach the child how he may keep well; it is essential also that the community should provide him with the materials which he may use for this purpose. Decent housing and good milk supply, to mention only two of the many health essentials, cannot be obtained through individual effort. They can, however, become a possibility through concerted effort. This is the responsibility of the community at large, and the community, of course, consists of the people who compose it. The obligation lies upon all citizens, both men and women. Any community can have proper sanitary and hygienic conditions, if it chooses. The late Hermann M. Biggs, M.D., furnished a slogan which can be proved to be true by any community that wishes to try it. Doctor Biggs stated that "Public health is purchasable. Within natural limitations any community can determine its own death rate."

NATIONAL AND STATE BUREAUS OF CHILD HYGIENE

The first Bureau of Child Hygiene in the United States was organized in New York City in August, 1908, as part of the activities of the Department of Health. There were, previous to that time, certain types of child hygiene work in existence in several cities, but it was mainly directed toward prevention of the spread of contagious diseases among school children and bore little relation to the present type of care of the health and health education in the schools. Baby-saving work was corrective only, and our modern methods of prevention of illness in infancy were unknown. Child hygiene as a consecutive program did not exist.

The work of organization of the Bureau of Child Hygiene in New York City was a pioneer achievement and the methods that were evolved had no precedent. That they were founded upon the right principles is shown by the fact that these same methods are in their essential features still followed by practically all bureaus or divisions of child hygiene to-day.

Notwithstanding the drawback of inadequate appropriations, there is probably no other national movement that has achieved so much or grown so rapidly in so short a period of time.

The United States Children's Bureau.—The Children's Bureau of the United States Department of Labor was organized in accordance with an Act of Congress which was approved by the President on April 9, 1912. The function of the bureau is set forth by the act as follows:

> The said bureau shall investigate and report to said department [the Department of Labor] upon all matters pertaining to the welfare of children and child life among all classes of our people, and shall especially investigate the questions of infant mortality, the birth rate, orphanage, juvenile courts, desertion, dangerous occupations, accidents and diseases of children, employment, legislation affecting children in the several states and territories. But no official, or agent, or representative of said bureau shall, over the objection of the head of the family, enter any house used exclusively as a family residence. The chief of said bureau may from time to time publish the results of these investigations in such manner and to such extent as may be prescribed by the Secretary of Labor.

Miss Julia C. Lathrop was appointed the first chief of the bureau, and served as such until her resignation in 1922. Her work in this position has left a record of achievement of which all citizens of this country may well be proud. The present chief is Miss Grace Abbott, and both she and Miss Lathrop are responsible for a large part of the present widespread activity and achievement in the field of child welfare. Any mention of the bureau's activities would be incomplete without recognition of the splendid services rendered by Dr. Anna E. Rude, the director of the bureau's Division of Maternity, Infancy, and Child Hygiene. The bureau has made many investigations of the causes of infant and maternal deaths, published valuable reports on these studies and others pertaining to the health of women and children, and has issued a vast quantity of valuable educational health material. A full statement of its contribution to child hygiene in this country is not possible within the limits of this brief

account, but many of the investigations and reports are referred to in the discussion of the various features of child hygiene.

State Divisions of Child Hygiene.—In 1910 New York State and Louisiana organized divisions of child hygiene. Other state divisions of child hygiene were organized as follows: 1915—Massachusetts (as part of the work of the Bureau of Hygiene), Kansas, New Jersey, Ohio. 1917—Illinois, Montana, New Mexico. 1918—Colorado, Florida, Virginia. 1919—Arizona, Arkansas, California, Connecticut, Georgia, Idaho, Indiana, North Carolina, Rhode Island, Kentucky, Missouri, Pennsylvania, South Carolina, Texas, West Virginia, Wisconsin. 1920—Alabama, Maine, Michigan, Mississippi, Washington. 1921—Delaware, Nebraska, Oregon, South Dakota, Vermont. 1922—Iowa, Maryland, Minnesota, Nevada, New Hampshire, North Dakota, Oklahoma, Tennessee, Utah, Wyoming.

Forty-three states and practically all of the cities in the United States now have bureaus or divisions of child hygiene under governmental control. In the other five states some form of organization for child-hygiene work under state control is carried on. All of these divisions and bureaus are supported by appropriations from the public funds. The appropriations show such a variation and are subject to such fluctuations that there would be little value in recording them.

The unit cost of child-hygiene work has been discussed in other chapters and the question of proper budgets has also received attention. At this time the matter is referred to only for the purpose of calling attention to the meager amounts that are usually appropriated for this work. With the exception of those places where the work is financed for the purposes of demonstration, by some of the foundations, such as the Rockefeller Foundation and the Commonwealth Fund, it is safe to say that there is not at present any community fully meeting the needs of an adequate child-hygiene program, either in financial support or in performance.

Child Hygiene Activities of the United States Public Health Service.—The United States Public Health Service does not carry on any extensive routine child health administrative work, but limits the exercise of its functions in this field to research and investigation of special problems relating to child health. However, at times it does maintain routine supervision to a limited extent in order to have access to material for study. These special activities are of gradual evolution from the exercise of the general functions under the provisions of the Act of August 14, 1912, Ch. 288, 37 Stat. L., 308, which authorizes the Public Health Service to study and investigate the diseases of man and conditions influencing the propagation and spread thereof.

The special interest in and attention to the health of children had their beginning in certain epidemiological studies in which advantage was taken of the presence in the schools of representatives of practically every family in a given community to study the prevalence and the effect of certain diseases. In the course of these studies observations were made with regard to the sanitation of the school environment and also in respect of the incidence of certain of the more obvious hampering physical defects. The inadequacy of the school health supervision noted in the course of these surveys was a determining factor in the making of special investigations of certain of the health problems arising in the schools and the final extension of these investigations to include the study of special health problems at other periods of child life.

The results of these earlier investigations were embodied in the publications Public Health Bulletin No. 58, "Open-Air Schools for the Cure and Prevention of Tuberculosis Among Children" and Public Health Bulletin No. 77, 1916, "Rural School Sanitation." In the exercise of its functions as a health education agency the Public Health Service printed, in 1913, Supplement No. 10, "The Care of the Baby," prepared by a committee of the American Associa-

tion for the Study and Prevention of Infant Mortality. This publication excited much interest and was given wide distribution.

As a later development studies in child health administration were made in a number of the States with a view of perfecting the organization of child health work within their respective jurisdictions. However, studies of this character were discontinued when funds and personnel became available through the provisions of the so-called Sheppard-Towner Act.

An enumeration of the special research studies undertaken by the Public Health Service would cover the whole field of child hygiene work carried on in recent years in this country. However, of special importance are the researches on the growth and development of children, particularly from the standpoint of the so-called height and weight standards and their application to the problem of nutrition in childhood; extensive investigations in mouth hygiene of school children (1) to determine the adequacy of dental facilities offered by different communities for children, and to stimulate communities to provide such facilities where needed, (2) to estimate the effect of mouth sepsis on school progress, and (3) to evaluate the effect of mouth sepsis on the growth of children; studies of the daylight illumination of school rooms; studies of the sight of school children for the purpose of (1) determining the sex and age distribution of defective vision in terms of refractive error, (2) estimating Snellen chart readings, if possible, in actual degree of visual defect (3) making more exact determination of the degree of myopia necessitating education in special classes, and (4) recommending appropriate measures for adoption to increase the visual comfort of school children; investigations to determine the influence of certain physical defects on mental and physical development; and studies in health education.

The general work carried on by the Public Health Serv-

ice in the field of sanitation has not been without effect on child health. The great improvement in public health administration, the better sanitation of the domestic and civic environment, and the great increase in the knowledge of health matters by the general public, traceable in no small degree to the activities of the United States Public Health Service, have brought about improvement in the health of the country as a whole and reduction in the general mortality rate, which is reflected in lessened morbidity and mortality among infants and children. The publication of the special bulletin on "Milk and Its Relation to the Public Health" by the Public Health Service, in 1908, was responsible in large measure for the very general enforcement of special measures safeguarding the milk supply and making it fit for the consumption of infants and children.

No mention of the child health activities of the United States Public Health Service would be complete without reference to the Act of July 1, 1902, under the provisions of which this Service supervises and controls the manufacture of biologic products so largely used for the prevention and cure of a number of the communicable diseases more usually occurring during childhood. The guarantee of the potency and purity of these products is not without effect on child life and health.*

National Organizations.—The value of child-hygiene activities was recognized by private organizations and interested individuals before it became a subject of governmental concern. Similar experience has been the common practice in nearly all of our great matters of public welfare. Governments are slow to act and nearly every great welfare movement has received its first impetus from private initiative. The American Association for Study and Prevention of Infant Mortality was organized in New Haven, Connecti-

* This account of the child-hygiene activities of the U. S. Public Health Service was prepared by Dr. Taliafero Clark, Surgeon, Medical Officer in Charge Field Investigations in Child Hygiene of the U. S. P. H. S.

cut, November 12, 1909. It is true that there was one governmental agency in existence at this time, for the Bureau of Child Hygiene of the New York City Department of Health had been organized in August 1908. The organization of this bureau, however, although it marked the first step in any governmental interest in the problems of child hygiene, exercised at that time a merely local influence. The organization of a nation-wide association to stimulate interest in the study and prevention of infant mortality was of profound significance.

Beginning with a few individual members and still fewer affiliated societies that were interested in child welfare, it has grown until in 1919 its expanding activities caused it to change its name to "The American Child Hygiene Association." In 1922 this association effected a consolidation with the Child Health Organization. Its membership is now increased to over 17,000 and its expenditures during 1922 amounted to over half a million dollars. The combined associations have taken the name of the American Child Health Association. The purposes of these organizations are expanding and elaborating so rapidly that anything more than a superficial reference to them would be obsolete within a short time. It may be said, however, that this association, with its large staff and generous appropriations, is conducting experimental studies and community work in child hygiene in Mansfield (Ohio), Fargo (North Dakota), and Athens (Georgia), and a proposed study is to be undertaken in a fourth community. These experimental studies are conducted by virtue of a special appropriation given by the Commonwealth Fund. The purpose of the American Child Health Association is to conduct investigations into the causes of infant and child sickness and death and to determine the most practical and economical methods of prevention of disease and assurance of sound health to infants and children. Surveys of existing work, research, public-health education, and the application of efficient and tested methods of public-health work for children are included in

the association's program. The consolidation of these two large national organizations is significant. The American Child Hygiene Association had concerned itself primarily with the problems relating to the prenatal, natal, and postnatal periods—that is, it was mainly concerned with questions of maternal welfare and the health of the child up to school age. The Child Health Organization had directed its efforts toward spread of health education among children of preschool and school age.

The contribution of the Child Health Organization of America, which has taken the form of new methods of health education or teaching health to children, especially in the schools, has been so important that it should be considered more in detail. In 1917 a number of interested persons conducted a demonstration of the value of school lunches in one of the public schools of New York City. Incidental to the question of giving the child the right kind of food, there arose many problems connected with the child's care in the home and methods whereby he might be kept well.

To meet these needs the children were weighed and measured regularly and urged to take an interest in their own health. Their mothers were also told the way in which they could co-operate by maintaining healthful conditions in the home. After this study had been carried to a successful conclusion, a small group of people, headed by Dr. L. Emmett Holt and Mrs. Frederick Peterson, formed a small committee under the name of the "Child Health Organization," with the object of interesting children in health subjects. The methods to be used were those that would appeal to the child's understanding and enlist his interest in keeping himself well. The use of a health clown—"Cho Cho," the health fairy, the picture man, the ventriloquist, and other types of entertaniers has been most successful in arousing children's enthusiasm in health matters. All of the pamphlets and other literature of this organization were printed in a type to appeal to the child's mind. Health games, health plays, and various forms of health activities in which the

children could take part were included in the organization's program. Official recognition of the organization was accorded by the United States Government by making it a subdivision of the Bureau of Education of the Department of the Interior, thus affording the opportunity for wide distribution of the information and pamphlets that were used. Methods of enlisting the interest of the children in the schools, including wide distribution of tables prepared to show the average height and weight of children of different ages, and monthly weighing and measuring of the children were urged. "A scale for every school" became a slogan. Without commitment as to the ultimate value of height and weight standards as an index of nutrition, it may be stated that the monthly weighing and measuring of children has been found to have enormous value as health propaganda and in stimulating a competitive spirit toward the maintenance of health.

At the time of the founding of the American Child Health Association, the Child Health Organization had extended its activities into practically every state in the Union, and in addition they announce that during the four years previous to 1922 they received requests for information regarding their public service from forty-six foreign countries.

Among the other large national organizations may be mentioned the Child Welfare League, the National Child Welfare Association, the National Child Labor Committee, the American School Hygiene Association, the National Association of Day Nurseries, and the National Kindergarten Association. Organizations having sections devoted to some phase of child hygiene are the National Tuberculosis Association, the American Public Health Association, the American Medical Association, the National Organization for Public Health Nursing and the National Education Association. There are also the organizations that feature child hygiene work as a part of their program, including the American Red Cross, the Boy Scouts, the Girl Scouts, the Campfire Girls, the National League of Girls' Clubs, and the

National Federation of Settlements. In addition, the great organizations of women, including the Association of Catholic Women, the Association of Jewish Women, the General Federation of Women's Clubs, the League of Women Voters, the Parent-Teachers Association, and the Mothers' Clubs have shown a vital concern with all that affects the welfare of children. The interest of all of these and other great national and local organizations crystallized the public opinion that made possible the passage of the Sheppard-Towner law.

The total number of agencies engaged in child welfare work cannot be accurately determined. A large number devote all of their energies to child hygiene. Many include all types of child welfare work. Some specialize on some one phase of child care such as the child-placing or adoption agencies, and others are those who are interested solely in infant welfare. There are the school hygiene societies and associations of which the national and local children's aid societies and the National Child Labor Committee and its local branches are instances. In addition, practically all of the large national welfare agencies direct some part of their work to child hygiene, and similar work is included in the programs of many national, state and local organizations whose main purpose may be educational, humanitarian, cultural, or social. In 1920 the Federal Children's Bureau published a list of local child-health organizations in the United States, and at that time listed over six hundred. There are probably many more at the present time.

The fact that so many different agencies are operating in the same field and with the same purpose has undoubtedly led to much duplication of effort and to a consequent lessening of efficiency. The type of co-operative effort that will correct this is not easy to obtain on any nation-wide scale. A beginning has been made in this direction by the formation of the National Health Council. This organization is an association of the national unofficial health agencies of all types. Its general purpose is set forth as follows: "(1)

The support of official health department work and of other governmental agencies interested in the various types of preventive medicine, the encouragement of their development, and the handing over of voluntary activities to official groups after adequate experiment and demonstration when such activities have been initiated under private auspices. (2) The education of the public to the general support of official health activities and the advocacy of active co-operation with the public-health officials by voting funds, by observing sanitary laws and by practicing personal hygiene."

The affiliated organizations of the National Health Council are the American Society for Control of Cancer, the American Child Health Association, the American Public Health Association, the American Red Cross, the American Social Hygiene Association, the National Committee for Mental Hygiene, the National Organization for Public Health Nursing and the National Tuberculosis Association.

Possibly the best type of local federation of child-welfare activities is that of the Children's Welfare Federation of New York City. This organization, under its former name of "The Association of Infants' Milk Stations," represents the first comprehensive and successful attempt at co-ordinating the various child-welfare agencies in any community. It started in 1912 as the Association of Infants' Milk Stations and was the result of the desire of the Bureau of Child Hygiene of the New York City Department of Health to systematize the work in the various baby health stations in the city. All of the organizations of this type agreed to co-ordinate their activities, using a certain type of record card, limiting their activities to certain specified districts of the city and sending their records to the central office, the purpose being to prevent duplication, obviate overlapping, and to systematize this work without interfering with the integrity or progress of any organization.

A central office was organized with a secretary in charge. By the end of the year the results of this co-operative effort

were so definitely effective that the agencies composing it decided to invite other organizations in New York City that were directly or indirectly working in the field of child welfare to join in the large co-operative movement for the reduction of the baby death rate. The response to this invitation was gratifying and thirty organizations joined forces, under the name of the Babies' Welfare Association. The form of organization was simple and effective. Each social-service agency appointed a representative to serve on a committee to co-ordinate the work of all social-service agencies as it concerned the care of infants. Similarly, all hospitals having baby wards formed a hospital committee. Other committees were organized with a representative from each organization doing a definite type of work, such as the day nursery committee, the committee on infants' milk stations, the committee on vacation societies, and so on. The chairman of each one of these committees was the representative of his group on the executive committee, the latter committee serving as a connecting link between the two groups. The purposes of the association remained the same, the main point being the elimination of all waste effort and the prevention of duplication. Added to this was the more extensive and effective use of the machinery of each organization than could be possible when they were functioning alone.

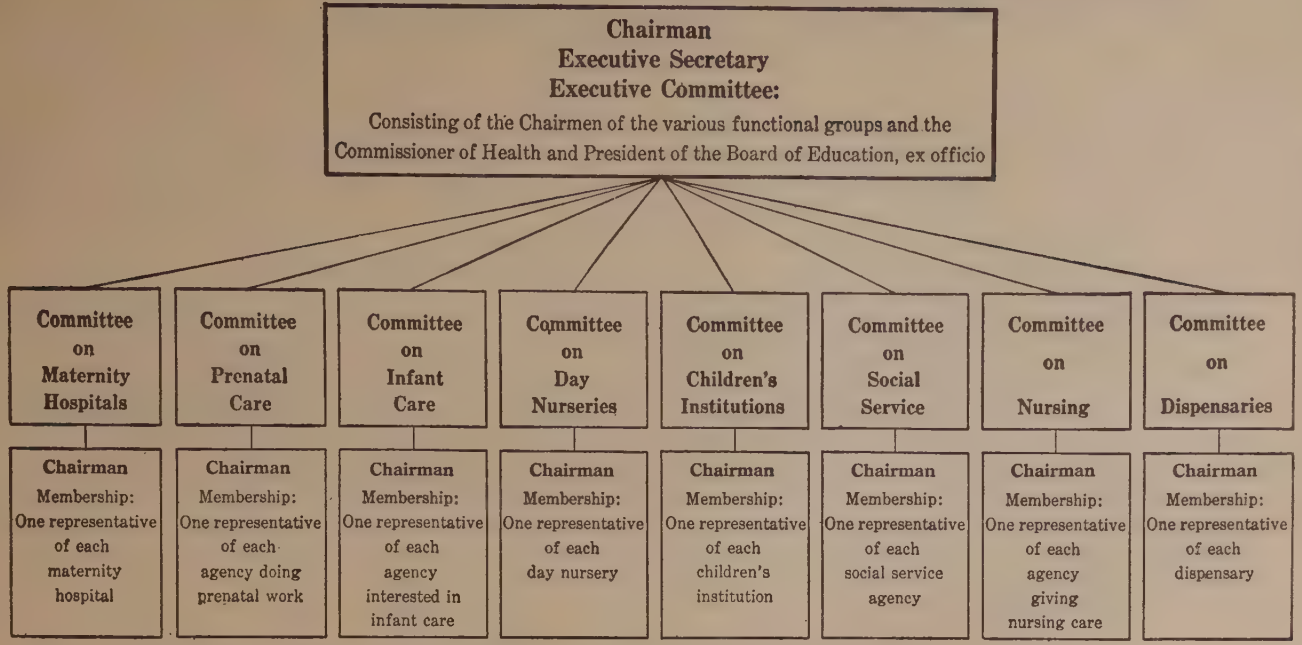
Concretely, one or two instances may be given to illustrate the value of this type of co-ordination. Formerly, when a mother or nurse wished to place a sick baby in a hospital, it was necessary to either call up or visit one hospital after another until one was found that could take a sick infant. Not infrequently it happened that the baby was dead before any hospital could be found to receive it. Under the association's plan for a central clearing house, the committee on hospitals reports to the central office at regular intervals the number of vacant beds for babies and the type of cases they can receive. Now any mother or nurse, or anyone else desiring to place a baby in a hospital, need only call

the central office of the association. That office makes all proper arrangements with the hospital and in ten or fifteen minutes telephones back to the waiting mother, telling her where to take her baby, and when she arrives at the hospital she is expected and the baby's bed is ready for him.

Again, many of the social-service agencies were appealed to because the mother in some family had been forced to go to a hospital and had no one in whose care to leave her children. The committee on day nurseries was consulted and within a short time arrangements were made whereby a nurse was placed on night duty in a certain number of the day nurseries. Since that time, if a mother has to go to a hospital, leaving young children, anyone can call up the central office of the association and arrangements will immediately be made for either taking these children to one of the day nurseries until the mother is recovered and at home again, or, through a branch of the social-service agencies, sending some one to the home to care for the children there. Formerly many hospitals discharged each year, a large number of mothers with new-born babies. In only a few instances was follow-up work carried on, and consequently the ignorance of these young mothers in many instances resulted in the death of the baby. Through the clearing house now, all hospitals that have no follow-up service of their own send the names of these mothers to the central office of the federation as soon as the women leave the hospital. The federation notifies the baby health station nearest the woman's home address, and the nurse from this station visits the home to see that the mother enrolls her baby at the station so that she may receive proper advice as to its care.

The organization of this federation has been discussed at length because it is probably doing more comprehensive and careful work in co-ordinating all child-welfare agencies than any other similar organization. There is a Children's Health Federation in Philadelphia, and attempts at this type of co-ordinating work have been carried on in other cities,

PROPOSED ORGANIZATION OF CENTRAL CHILD HYGIENE COUNCIL[1]


Chairman
Executive Secretary
Executive Committee:
Consisting of the Chairmen of the various functional groups and the Commissioner of Health and President of the Board of Education, ex officio
Committee on Maternity Hospitals
Chairman
Membership: One representative of each maternity hospital
Committee on Prenatal Care
Chairman
Membership: One representative of each agency doing prenatal work
Committee on Infant Care
Chairman
Membership: One representative of each agency interested in infant care
Committee on Day Nurseries
Chairman
Membership: One representative of each day nursery
Committee on Children's Institutions
Chairman
Membership: One representative of each children's institution
Committee on Social Service
Chairman
Membership: One representative of each social service agency
Committee on Nursing
Chairman
Membership: One representative of each agency giving nursing care
Committee on Dispensaries
Chairman
Membership: One representative of each dispensary

NOTES: (a) *The formation of additional committees will suggest itself from time to time to meet new developments of the work.*

(b) *Joint action through the various committees with other groups such as the Central Nursing Committee and the Section on Dispensaries as proposed for the Hospital Council, etc. should be provided for.*

[1] From *A Program for Child Health.* Part three, Cleveland Hospital and Health Survey.

notably Cleveland, Ohio. The accompanying chart gives a diagram of a suggestive form of organization which was made as part of the health survey in Cleveland undertaken in 1920. The type of organization for a central clearing house of child-hygiene agencies in any community must necessarily vary with the character of the organizations and the local problems to be met. Such co-ordination and co-operation are essential for the success of a child-hygiene program in any community.

Child hygiene has now won a recognized place in the field of preventive medicine and public-health work. The value of health work for children is no longer a matter of dispute. We know that the prevention of disease and the inculcation of health habits in adult life are difficult, and the results are palliative at best. Health habits may be acquired at any time, but the effects of their previous neglect are not soon eradicated. The time to prevent illness and to assure sound health is in childhood. The way is easy, the methods simple, and the results certain. Children are the material with which we must build the world of to-morrow. Their minds and their bodies are receptive of whatever we choose to give them. The responsibility for their future health is ours. To give them sound and virile bodies and an alert and sane mentality is our task. In their response to our efforts we find our greatest inspiration. To achieve universal child health is possible if we will apply the knowledge we already possess. We must be content with nothing less.

CHAPTER III

ADMINISTRATION

"The saving of baby life becomes more of a socio-economic than a medical problem, more a question of education and prevention than of treatment, more a matter of housing, overcrowding, personal and home hygiene, family income, employment, alcoholism, gainful occupation of the mother, racial or religious prejudices, customs, and superstitions; in other words, more a question of environmental adjustment, industrial opportunities, living wage, and civic pride, rather than of caring for babies when they are sick."—JACOB SOBEL, M.D.

CHILD-hygiene administration is based upon two fundamental principles: first, the welfare of the child must be the primary consideration; second, emphasis must be placed not upon the activity, but upon the child.

The first of these truisms may seem superfluous but there can be no doubt that organization can become so fascinating in its methods that its purpose may drop from sight. The rapid development of any type of work often brings with it over-accentuation of methods and extreme specialization. Child hygiene has been no exception. It is true that methods and types of organization have had to be worked out and that, necessarily, many of them have been found wanting. There is a tendency, however, for us to become complex with regard to this matter.

Child hygiene and all that it implies is essentially simple. In fact, it has been the experience of those who have followed its development that the simple methods have been the most successful, and any complexity or over-specialization has tended to defeat its own purpose.

The test of value of any type of organization would seem to lie in the answer to the two following questions: first,

is the child healthier?—second, does the child respond and co-operate? The point must always be kept in mind that we should not stress the act, but place the emphasis upon the child. A child is not a case of measles or of adenoid growths or trachoma or even malnutrition. Our point of view becomes exceedingly biased if we look at the child in that way. We must consider the child *as a child* and think of him *as a child* who is undernourished or who has adenoids or any of the other diseases or defects. This probably cannot be more clearly expressed than to say that we must work from the child outward rather than from the activity inward. Unless we can see the child with regard to all of his surroundings, his habits of life and his personality, we will accomplish little by correcting any physical defect that may have occurred as an incident in his life.

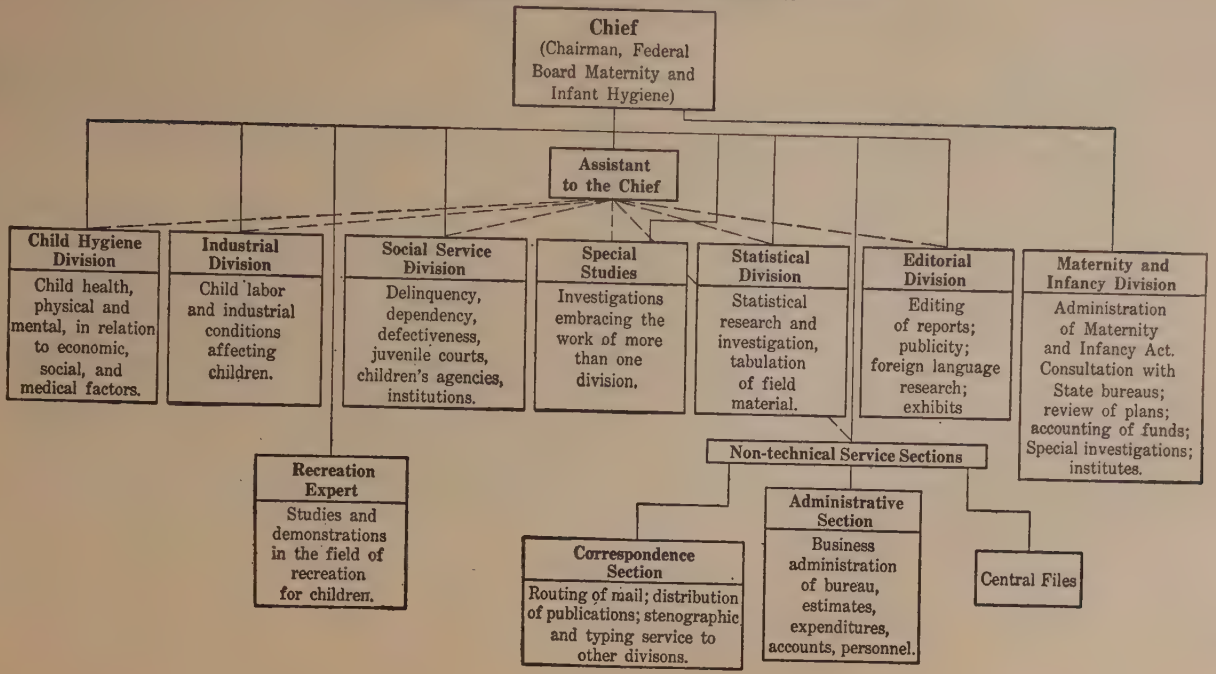
Moreover, child hygiene work cannot be successful until it enlists the co-operation of the child. We cannot impose health upon children, but we can lead them to it. A recognition of this has led to the great success of our modern methods of health education of children. Children are not interested in health as an abstract proposition. A child will not have a tooth filled because he may possibly have a toothache at some indefinite time in the future. He will not sleep in a room with open windows because he has been told that it is healthy to do so, but he will have his tooth filled if he is to be barred out of athletic contests if he neglects to do so, and he will sleep with his windows open if he has been accustomed to do so from babyhood and accepts it as just as necessary a part of his existence as eating or breathing.

Didactic teaching of hygiene to children is a thankless task. The methods that are generally employed in nearly all of our schools to-day are worse than useless. The only recompense is that the child forgets the subject matter almost as soon as it is presented. Buoyant health, vitality, and the keen zest of living do not come through presentation of the habits of germs or the evils of alcohol. Health

CHILDREN'S BUREAU

U. S. DEPARTMENT OF LABOR
WASHINGTON

To investigate and report "upon all matters pertaining to the welfare of children and child life"


Chief
(Chairman, Federal Board Maternity and Infant Hygiene)
Assistant to the Chief
Child Hygiene Division
Child health, physical and mental, in relation to economic, social, and medical factors.
Industrial Division
Child labor and industrial conditions affecting children.
Social Service Division
Delinquency, dependency, defectiveness, juvenile courts, children's agencies, institutions.
Special Studies
Investigations embracing the work of more than one division.
Statistical Division
Statistical research and investigation, tabulation of field material.
Editorial Division
Editing of reports; publicity; foreign language research; exhibits
Maternity and Infancy Division
Administration of Maternity and Infancy Act. Consultation with State bureaus; review of plans; accounting of funds; Special investigations; institutes.
Recreation Expert
Studies and demonstrations in the field of recreation for children.
Non-technical Service Sections
Correspondence Section
Routing of mail; distribution of publications; stenographic and typing service to other divisons.
Administrative Section
Business administration of bureau, estimates, expenditures, accounts, personnel.
Central Files

is positive and no one recognizes this fact so readily as the little child, therefore we must emphasize the two points that we have been considering, for upon the extent of our recognition of them will depend our success or our failure.

Functions.—The functions of a Bureau of Child Hygiene should be:

1. Regulation and standardization of obstetrical procedure by
   (a) education, licensing and control of midwives;
   (b) supervision of standards of lying-in hospitals;
   (c) provision of maternity nursing.
2. Prenatal work, including
   (a) establishment of prenatal or maternity centers;
   (b) supervision and instruction of expectant mothers;
   (c) essential legislation for protection of women of child-bearing age or pregnant women in industry.
3. Reduction of infant mortality by
   (a) measures outlined under 1 and 2;
   (b) instruction of all mothers of children under one year of age, with necessary health supervision of such infants;
   (c) readjustments of social, economic, and environmental conditions;
   (d) education of young girls in personal hygiene and in the care of infants.
4. Health supervision of children of preschool age by
   (a) maintenance and supervision of day nurseries;
   (b) supervision and control of institutions caring for dependent and delinquent children;
   (c) health examinations and follow-up of children of preschool age.
5. School medical inspection by
   (a) health supervision of all children of school age;
   (b) establishment and maintenance of standards for school hygiene;
   (c) establishment or supervision of adequate facilities

for the treatment of defects or illness of children.

6. Child labor
   (a) establishment of legal standards controlling the employment of children;
   (b) supervision of children under sixteen years of age engaged in industry;
   (c) establishment of health standards essential for the issuance of employment certificates.

Organization.—The organization of each particular type of child-welfare work must be considered by itself and will be discussed in connection with each particular activity. In general, however, the organization of bureaus of child hygiene will depend largely upon three factors: first, the type of population to be reached, whether rural or urban; second, the character of the population, including the extent and distribution of various race groups; third, the amount of appropriation available.

The organization of bureaus or divisions of child hygiene follows a partially standardized form, adapted to local needs. Public-health work for children, as conducted by private organizations, whether national or local, must usually have its organization conform to the necessary limitations of any association that is under private control. The broad powers that belong to bureaus of public health are reflected in all of their subdivisions. These powers are derived from the government and therefore state, city, town, or county divisions of child hygiene have an authority that is not possessed by any private organization. This difference between public and private agencies should be kept in mind.

The Organization of State Divisions of Child Hygiene.—There is a great difference between the organization of a division of child hygiene in a state and one in a city or rural community. State divisions are usually a part of the state department of health. (In those states that are taking advantage of the Sheppard-Towner law this relationship

NEW YORK STATE DEPARTMENT OF HEALTH
DIVISION OF MATERNITY, INFANCY AND CHILD HYGIENE
Regional Consultants in Pediatrics
Consultants in Child Hygiene
DIRECTOR
Consulting Pediatrician
Regional Consultants in Obstetrics
Associate Director
Assistant
Office Administration
Asesistance in Organization and Extension of Community Maternity and Child Health Activities
Giving Service and Demonstrating Methods to Communities to Assist them in establishing Local Activities
CHILDREN'S HEALTH CONSULTATIONS
Demonstration
Preschool Exams.
Instruction in Hygiene
PRENATAL CONSULTATICNS
Instruction, examination and supervision of expectant mothers
ORTHOPEDIC CLINGS
After-care of Poliomyelitis and other orthopedic cases.
ORGANIZATION SERVICE
Stimulation and organization of communities
FINANCIAL AID
Participation in payment of nurse's salary, physician's honorarium
DEMONSTRATION NURSING SERVICE
Services given to communities during organization period
CONSULTANT NURSING SERVICE
Organization of new work
Extension of work in Mother and Child Hygiene Stations
PUBLICITY LITERATURE AND EXHIBITS
Press publicity, pamphlets, posters films, sterile obstetric package, layettes etc. lectures and fair demonstrations and exhibits.
SURVEYS AND STUDIES
Information concerning Maternity and Child Hygiene and conditions in localities, also demonstrations.
SUPERVISION OF CHILD CARING INSTITUTIONS
Day Nurseries, Boarding Homes, Maternity Hospitals.
INSPECTION OF PUERPERAL SEPSIS AND OPHTHALMIA NEONATORUM
MIDWIVES
Licensing
Supervision
Instruction
NUTRITION SERVICE
Instruction and organization of nutrition work. Dietary Studies.
EXTENSION COURSE FOR NURSES
Instruction in Maternity and Infant Hygiene and Methods of teaching mothers.
COOPERATION WITH ORGANIZATIONS
Medical societies, nursing societies, women's organizations and others giving suggestions and assistance as to local maternity and child hygiene work by lectures, literature, correspondence etc.

is a requisite.) The functions of the state departments of health are in only exceptional instances of a directly administrative nature. Practically all state departments of health are responsible for sanitary laws, and such departments have the broad police powers that have been mentioned before. They have, therefore, the authority to act in any community in the state when such action seems imperative or even necessary. As a matter of practical administration, however, a state department usually functions in an advisory capacity, leaving the various communities of the state to carry out their own health programs. Only when a community fails to do this in a proper manner does the state usually take action. The state, however, maintains a type of supervision over any form of local health activity, and state health departments usually have programs for different types of health work that practically have the effect of law; that is, these programs are the ones that the communities of the state are expected to follow. Each community may go as far in advance of the state program as it chooses, but it cannot, in certain phases, maintain a standard below that set by the state.

In considering the organization of state divisions of child hygiene, we must realize that it is largely their function to plan, supervise, and, to a certain extent, direct the work in the different communities of the state, but it is rarely within their province to actually carry on the work. Such divisions are usually organized under the title of "division of child hygiene" or "division of maternity, infancy, and child hygiene." The staff is headed by a director. This officer is generally a physician, though a number of states have appointed nurses as heads or directors of their divisions of child hygiene. The size of the staff of state divisions depends largely upon the extent of the money appropriated.

In some states the budget is so small that it allows only for a director or chief and the necessary office staff of one or more clerks or stenographers. This is the minimum type of organization, and from that one may find all types

Texas State Board of Health
Bureau of Vital Statistics
Bureau of Venereal Disease
Bureau of Child Hygiene & Public Health Nursing
Bureau of Rural Sanitation
Bureau of Sanitary Engineering
Bureau of Bacteriology
Director
Education
Literature, Films, Magic Lantern Slides Posters, and Lectures
Special Lecturer
Dentist
Traveling Dental Clinic
State District Advisory Nurses
County Public Health Nurse
General Public Health Nursing
Sanitary Inspection
School Inspection
Preschool Child
Infant
Maternity
Prenatal
Child Health Centers
Preschool Child Clinic
Infants Clinic
Arrangements for Maternity Care
Prenatal Clinics
Distribution of Silver Nitrate Ampoules

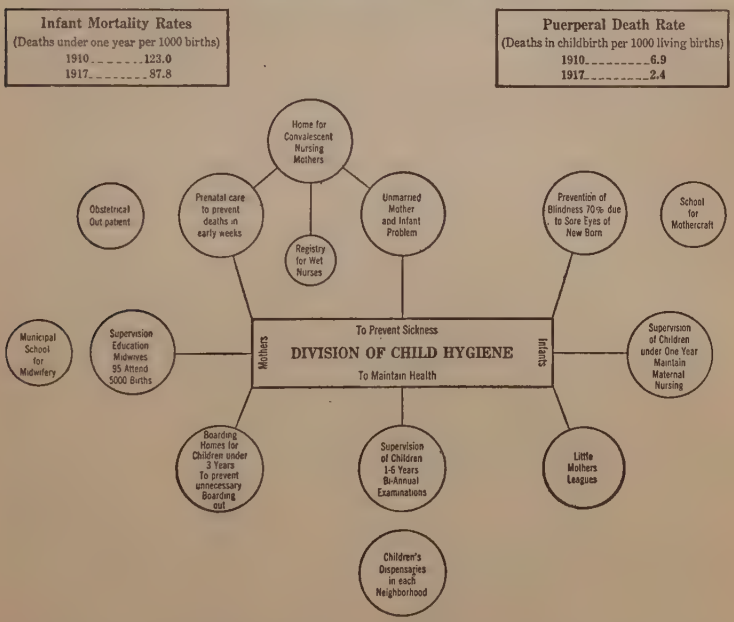
of gradation to that which exists in states like New York, that have large appropriations and the opportunity for extensive work. In the latter type, the organization may and usually does consist of the director of the division, an assistant director, a superintendent of nurses, and a staff of nurses, and there may be chiefs of subdivisions such as those pertaining to maternal welfare, infant welfare, and hygiene of the child of either preschool or school age. There may be more specialized subdivisions, including those that have to do with enforcement of the child-labor law and supervision of the care of crippled children, maintenance and supervision of nutritional classes or clinics, dental clinics, and those having to do with conservation of eyesight or treatment of diseases of the eye. Some state organizations are founded on county or parish lines. The staff then consists of physicians or nurses who spend practically all of their time in the field and are responsible for child-hygiene work in definite areas of the state. This type of organization is common in the less densely populated states, particularly in states in the South and West, where rural work of this kind assumes a greater importance than it does in the more populated states of the East, but whether the work of the division or organization is upon functional lines or those relating to direct supervision in state communities, the methods employed are much the same. In some states money appropriations are made by the state to various counties or local communities, providing the latter make an appropriation sufficient to equal that of the state. The state division of child hygiene instructs the community as to the proper methods of organization within its limitations. It sets certain fixed standards that must be adhered to. It supervises the work and constantly stands in an advisory capacity, but the actual work itself is done by and under the supervision of the officials of the local division.

Organization of City, Town and Rural Divisions of Child Hygiene.—These divisions are purely administrative in their nature. Large cities may have so extensive an

Alabama Tuberculosis Association
ALABAMA STATE BOARD OF HEALTH
American Red Cross Gulf Division
Bureau of Child Hygiene and Public Health Nursing
Administration
Correspondence and Office Routine
Records
Publications
Service
Newspaper and Magazine Articles
Bulletin Notes and Professional Journals
Circularizing
Health Officers
Schools of Nursing
Industrial Plants
Other Agencies
Outline Standard Requirements for Candidates for P.H.N. Positions
Find and Refer Nurses for Positions
Development of P.H.N. Activities
Development of Training Field for P.H.N.
Instruction of Midwives
Advice on P.H.N. Problems
Education
Preparation of Material for Class Use
Primary, Secondary and Normal Schools
Club Study Groups
Library Service, Literature and Exhibit Material
Demonstrations
School Nursing
Industrial Nursing
Community Nursing
Rural Problems
Preventive Medicine
Development of Group Activities
Nutrition Classes
Classes for Mothers and Babies
Classes for Expectant Mothers
Dental Clinics

appropriation that they are organized on a functional basis, with various subdivisions, such as divisions of prenatal work, maternal care, infant welfare, care of the preschool child, school medical inspection, and so on. They, too, may become highly specialized and have many more subdivisions relating to the finer details that are included under child hygiene. In small towns the work is more indirect, and

DIVISION OF CHILD HYGIENE - NEWARK, N.J. - DEPARTMENT OF HEALTH


Infant Mortality Rates
(Deaths under one year per 1000 births)
1910 123.0
1917 87.8
Puerperal Death Rate
(Deaths in childbirth per 1000 living births)
1910 6.9
1917 2.4
Home for Convalescent Nursing Mothers
Obstetrical Out patient
Prenatal care to prevent deaths in early weeks
Registry for Wet Nurses
Unmarried Mother and Infant Problem
Prevention of Blindness 70% due to Sore Eyes of New Born
School for Mothercraft
Municipal School for Midwifery
Supervision Education Midwives 95 Attend 5000 Births
Mothers
To Prevent Sickness
DIVISION OF CHILD HYGIENE
To Maintain Health
Infants
Supervision of Children under One Year Maintain Maternal Nursing
Boarding Homes for Children under 3 Years To prevent unnecessary Boarding out
Supervision of Children 1-6 Years Bi-Annual Examinations
Little Mothers Leagues
Children's Dispensaries in each Neighborhood

frequently one or two employees will have full responsibility for the administration of all types of child-hygiene work. This is true also with regard to the rural communities. It is probable that direct or functional type of organization, having subdivisions dealing with different features of the work, is not only the most practical, but also the most economical, in cities containing over 100,000 inhabitants. In those cities where the population is less than this number, or in rural communities, it is frequently not only necessary,

but more effective, to have the school doctor responsible also for the medical side of the infant and maternal welfare work, and the functions of the school nurse and the baby-health-station nurse lodged in the same individual.

Rural Communities.—The type of work that has been found most valuable in rural communities is that which is most flexible in its nature and so planned that it will reach a great number of people without a great expenditure of money or a high unit cost. When the population is widely distributed it becomes impossible for any number of people to go to any local health center. The plans, therefore, must include reaching the communities by some other method. Usually the units of population in a rural community are so small that they cannot support a child health center, but through the activities of the state division of child hygiene it may be possible to organize such a center in each community on the basis of one day's service each week or each two weeks. The easiest way to give this service is through the use of what is known as the *healthmobile.*

The healthmobile is a specially constructed motor-car body which may be mounted on almost any chassis. The Ford truck chassis has been found particularly convenient for this purpose. The body is an inclosed one and within it there should be a compact baby and child welfare exhibit, consisting of attractive posters and charts, child-welfare literature for distribution, and portable outfits for setting up temporary dental, eye, nose, and throat clinics. The addition of a moving-picture machine to the outfit and a supply of good health films are valuable aids. The local schoolhouse is usually the best place to be used in connection with the service of the healthmobile. Through the school children the families of the community may be notified many days in advance of its arrival. Mothers may then plan to bring their babies and younger children, and if the staff of the healthmobile can consist of a physician, dentist, and

nurse, an immense amount of work may be accomplished in one day.

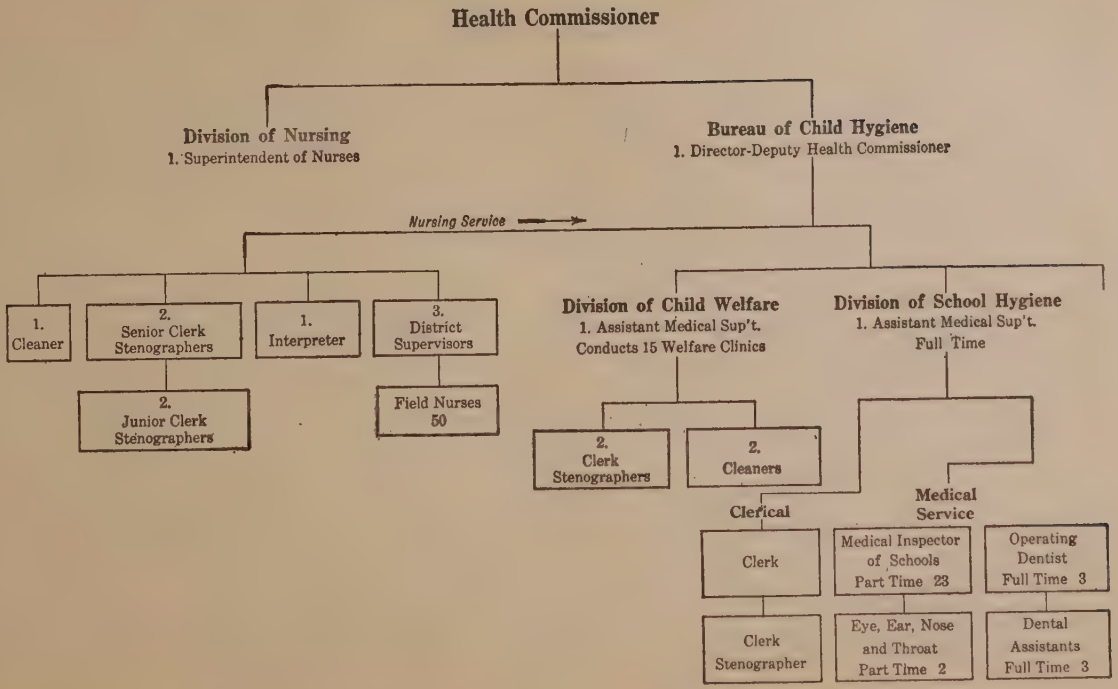
Frequently the holding of a child-welfare exhibit in a schoolhouse will be an enormous benefit. Before any community can be reached or made interested in problems connected with health, it must be shown why it is necessary. Exhibits, which must be attractive, should include the demonstration of all the equipment needed in a baby health station, the proper articles of clothing for children, with patterns for distribution, and demonstrations of the value of methods of child hygiene. These may be supplemented by mothers' meetings, talks, or demonstrations to be given by the nurse, health games for the children, and the use of moving pictures whenever possible. Baby contests are usually successful in stimulating interest in baby care. If school medical inspection is included in the program, the school nurse will be found a valuable ally in the work for the younger children, and, once organized, it may become part of her regular program.

The fact that nearly all state divisions of child hygiene maintain supervision over the health of the child from the prenatal period to the school-entering age makes it difficult to draw up a program which will include all of the features of child care. School medical inspection, which will be considered later, is in so many instances under the direction of the state board of education or is considered as an entirely separate function, even when under a state board of health, that for practical purposes our consideration of the programs of state divisions at the present time will exclude school medical inspection. It is to be hoped that everything relating to child health will in time be included under the same general administration.

Public Health Education of Mothers.—The type of public-health education of mothers with reference to the care of children that can be carried on by state divisions of health is quite different from that carried on by city divisions. State divisions, dealing as they must with women

MILWAUKEE HEALTH DEPARTMENT

CHILD WELFARE ORGANIZATION



living in isolated places or even those who live in town but who have not the advantage of a local child-welfare center or of easily obtaining clinic and hospital facilities, must necessarily reach women to a large extent by means of printed matter. Pamphlets on prenatal, baby, and child care for distribution by state divisions of child hygiene should be written in a straightforward, explicit, and detailed manner. All features of baby and child care should be covered in such a simple way that any mother may be able to follow them after reading the directions given.

A series of prenatal letters sent out on request to all pregnant women will be found of great value. Postnatal letters, to be sent out once each month during the baby's first year, are also effective. Syndicate articles in newspapers, leaflets, and pamphlets of all kinds and general health education and propaganda are necessary. The value of any printed matter is doubtless not so great as that of the spoken word. In more settled communities, and particularly in large cities, the direct advice given by the nurse will be found more valuable and helpful than any amount of printed directions. The latter must, in any event, be considered a makeshift. In many sections of the country where foreign races form a large part of the population, it has been estimated that 75% of the people cannot be reached through the printed word. Moreover, it has been found that pamphlets of this kind, printed in foreign languages, are practically useless. The greater number of foreign women whom we wish to reach cannot read their own language. This is also true of their husbands, although possibly in a slightly less degree. In the majority of instances the only members of the family who can read are the children, and the children invariably can read English only. Therefore, health pamphlets of this type should be printed in English. They should be short, concise, and with a direct appeal. Excellent samples of this type of pamphlet may be obtained from almost every state department of health or will be supplied by the Children's Bureau at Washington.

Specialized Service.—In any type of organization the fact must be kept in mind that preventive health work for children is a definite specialty, therefore it should not be considered as a by-product of any other type of public-health work. When we realize that child-hygiene work is essentially preventive in its nature and that nearly all other types of public-health work are at least partially if not wholly corrective, it may readily be seen that any combination of these two types of work will result in the corrective work taking precedence. In rural communities we may concede that a public-health nurse may have to carry on every type of public-health work because she is often the only public-health official in the territory that she covers. With this single exception, child-hygiene work should be sharply differentiated and separated from other types of public-health work.

If a physician employed by a board of health must visit certain reported cases of contagious diseases, he will be required to do so as the first part of his duties each day, for such visits necessarily demand immediate attention. If he has any time left over he may devote it to preventive work among infants and young children. It has not been the common experience, however, to find that these physicians have any time left after they have carried out the necessary duties with regard to the control of infectious diseases. The school doctor or the doctor in the baby health station should have no other duties in any other public-health lines than those concerned with prevention of disease during childhood. The visiting nurse who must do home nursing, including care of the sick, may be required, particularly if she is employed by a health board, to make visits to cases of infectious diseases, including tuberculosis, and will find little, if any, time or energy left to devote to what may seem to be an abstract proposition of health education. A visit to a person ill with typhoid fever cannot be delayed; the mother of a perfectly well baby may wait for a long time before she receives the essential health instruction;

yet the chances of the death of the baby under one year, cared for by an ignorant mother, are far greater than the chances of death from typhoid fever at any age.

In the stress and hurry of district nursing it is difficult to regulate these two functions correctly, and even if a nurse so desires, the urgent nature of part of her work becomes so great that she is forced to eliminate any other part of it that does not require immediate attention. In a Midwestern city a generalized nursing service is carried on and each public-health nurse has among her duties caring for the sick, visiting cases of tuberculosis and venereal diseases, assisting in the dental and eye clinics, school nursing and instruction of mothers in the care of babies. A personal investigation revealed the fact that, although it was presumed that one-sixth of each nurse's time was given to each of these functions, the record showed that out of every one hundred hours of service, the average time given to the instruction of mothers in the care of babies was less than one and a half hours. It was found that dozens of record cards taken at random from the filing cases showed that babies and their mothers had not been visited for periods ranging from one to six months. In every case the nurses stated, when questioned, that they wished to make visits to well babies, but necessarily had to care for sick persons first, and little or no time was left over after this had been accomplished.

One of the arguments that have been advanced against specialization in public-health nursing is that more than one nurse might readily visit the same family. In order to determine whether or not this was so, studies have been made in Detroit and Grand Rapids, Michigan, and in New York City, covering many thousands of cases visited by the public-health nurses. The proportion of cases in which more than one nurse visited a family ranged from 1 to slightly over 2 per cent in these three cities. Such a small percentage of duplication of visiting need not be considered as of any great importance; in fact, the same amount of

duplication might easily exist with a generalized nursing service carried on by more than one organization.

The point I have been making is a controversial one. There is a vast difference of opinion on this subject, but I am convinced by long experience with the subject that unless the doctors and nurses who are charged with supervision of child hygiene actually devote their entire interest and thought to this subject, only partial success can be achieved.

Budgets.—The extent of the appropriation is, of course, the determining influence in the type of work that can be carried on. We may feel that, for certain reasons, it is most regrettable that the federal appropriations are based upon the population of the states. This may seem a fair basis, but, as a matter of practical fact, those states that have a small population and the need to serve more widely distributed groups of people—many of them practically isolated in rural communities—find such work vastly more costly in relation to the number of people reached than is the case in a compact, well-settled, and highly organized city or town. Unit costs are not comparable in cities and in rural communities. They can be worked out and may serve as a fair standard when applied to definite types of communities. In large cities, for instance, the work of school medical inspection can be carried out at a cost of from six to ten cents for each physical examination, and from ten to fifteen cents for each home visit. This is based upon a proportion of from 3,000 to 5,000 children under the care of one doctor and one nurse. In rural communities, where the doctor and nurse may have to visit ten to fifteen schools in order to serve their quota of from 500 to 1,000 children, the cost of the physical examination may be placed at twenty-five cents as a possible minimum, and a visit to a home may cost the community anywhere from twenty-five to fifty cents. So with baby-health-station work. In a city where from 300 to 500 babies are registered at a single station, the unit cost may range from

seventy-five cents to a dollar a month for each baby cared for. In the case of a larger registration this cost may even be reduced to fifty cents per month per baby. In a small community where the registration at the baby health station may vary from 50 to 150, the unit cost will be proportionately greater and may easily range from a dollar and a half to two dollars and a half per month per baby cared for.

The salaries paid to the officials likewise vary according to the locality served. In a large city or a large town the director of each division should receive at least $5,000 a year. In a rural community or small town, the salary may range from $1,200 to $2,500. It is interesting to note that this wide variation in salaries applies more to physicians than it does to nurses. It is a curious thing that, speaking generally, the salaries for public-health nurses in rural communities and small towns are usually as large as, and in many instances larger than in cities. Salaries from $1,800 to $2,400 for rural nurses are not uncommon. Frequently the community furnishes an automobile and the cost of its maintenance for the use of the nurse. In our large cities salaries range from $1,200 to $1,800, with the majority receiving an average salary of from $1,400 to $1,500. Out of this salary the nurse must pay her own car fare, and when one considers the relative cost of living in cities and in rural communities it will be realized that the city nurse is at a marked disadvantage in this regard.

In order to determine the amount of money necessary for proper child-hygiene work in any community, one must know the character of the community to be served and the problems in child hygiene that may be encountered. For this reason surveys are necessary. The nature of these surveys will be considered later. At this time it is sufficient to mention the following factors which must be taken into account: (1) extent of the population; (2) character of the population, including (a) race, (b) social and economic conditions; (3) type of community, whether rural or urban;

(4) living conditions, including housing and sanitation; (5) character of the community, whether of agricultural, manufacturing, or other marked type; (6) extent of the territory to be covered; (7) maternal death rate; (8) birth rate and infant death rate; (9) number of children of preschool age and the morbidity and mortality in this age group; (10) the character of the disease and the death rate from communicable diseases; (11) number of schools, their individual registration, and the number of school children.

The Magna Charta of Childhood.—There are certain fundamental rights that belong to childhood. Until our efforts are so far-reaching and so complete that these are assured to every child, we may not feel that our goal has been attained. To enumerate in detail everything that the child needs and should have is probably not feasible. The methods of child-hygiene work and the forms of organization used must always be elastic and capable of adjustment to the changing needs of the times and the child. It does seem possible, however, to draw up a "bill of rights" of childhood that will comprise the goal we are seeking. This, it seems to me, should include the following considerations, and may be called the "Magna Charta of Childhood":

1. Each child shall have a heredity of physical and mental health, and every mother shall receive the necessary instruction and care during her pregnant period and at time of confinement, so that her own health will be protected and her child born healthy.

2. There shall be no deaths of babies from preventable causes, and the economic and social factors in every community that have made possible the present high baby death rate shall be corrected.

3. No mother shall be without the necessary surroundings, care, and information that will enable her to keep her baby well.

4. Every child of preschool age shall have adequate health supervision and a healthy environment.

5. The health supervision of children of school age shall be complete and adequate. The spread of contagious diseases in childhood shall be eliminated, the occurrence of physical defects prevented.

6. The home and school surroundings of every child shall be maintained in so hygienic and sanitary a manner that every child may have

a safe and healthy place in which to live, and in which to spend those hours when it must be in school.

7. No child under sixteen years of age shall be employed to work for gain and no child under eighteen years shall be employed for gain unless he is in sound health and physically fitted to perform the work he intends to do.

8. There shall be in each state the necessary legislation to secure for each child the essential protection of its health, happiness, and mental and physical well-being.

9. The right of the child to be well born, well reared and to be assured of the heredity and environment which will give and keep sound health, in both body and mind, shall be considered the predominant right of childhood.

CHAPTER IV

VITAL STATISTICS, RECORDS, AND RECORD-KEEPING

"Infant mortality is the most sensitive index we possess of social welfare. If babies were well born and well cared for, their mortality would be negligible. The infant death rate measures the intelligence, health, and right living of fathers and mothers, the standards of morals and sanitation of communities and governments, the efficiency of physicians, nurses, health officers, and educators."— Sir Arthur Newsholme.

Vital statistics are the bookkeeping of the public-health movement. Without accurate knowledge of the vital statistics of a community, no public-health work can be founded upon a sound basis, nor can its results be known with any degree of accuracy. Doctor Trask has given a definition of vital statistics that may be accepted as a standard. "Vital statistics may be defined as statistics relating to the life histories of communities or nations. They pertain to those events which have to do with the origin, continuation, and termination of the lives of the inhabitants. They commonly include statistics of births, marriages, and deaths, and the conditions attending these events."

Vital statistics are based upon the population as a whole or upon some definite group in the population. Thus the frequency of births, marriages, sickness, and death is generally expressed in terms which relate to the population as a whole, these rates usually giving the number for each thousand inhabitants or special class of inhabitants.

In order that we may have definite knowledge as to the population, information which is essential not only for

computing vital statistics but also for innumerable other reasons, a census is taken by the federal government once every ten years. Many states take a census of their population midway between the dates on which the census is taken by the federal government. Such a census records facts which are of value in the public-health movement. It shows the character of the population of the United States as a whole, of the individual states or of any part of a state. The statistics as to sex, age, and race or nativity are the ones that most vitally concern the public-health officials.

Vital statistics are generally collected by local or state health officers or by some one especially designated by the government as the official registrar or recorder of such statistics. These statistics must include the births, marriages, and deaths in a community as a basis for computing the essential morbidity and mortality statistics upon which the public-health program will be based.

Both marriage and death rates are usually expressed as the number occurring during the calendar year per 1,000 population, and in order that they may be comparable in different localities, what is called the "mean population" of the community is used—that is, the population as of July 1st, the middle of the year.

How to Determine the Population of a Community.—(a) *Arithmetical Method.*—As has been stated, the census is taken once every ten years. In order to estimate the increase or decrease of a population it is estimated that the total increase or decrease during the ten intercensal years or the time intervening between two census periods takes place in equal amounts in each year in question and will continue to take place in equal amounts each year until the next census is taken. Example: The census taken of a certain city on June 1, 1900, showed a population of 50,000. The following census, taken on June 1, 1910, showed a population of 60,000. The increase during the intercensal period was therefore 10,000 and the annual increase of population would be 1,000 for each year in ques-

tion. If one wished to find the population of this town as of July 1, 1906, the population of June 1, 1900, would be taken as a basis. To this would be added 1,000 for each year intervening between the date of the first enumeration, June 1, 1900, and the date for which the estimate is made. As there are six and one-twelfth years between these dates, the problem would read as follows:

$$50{,}000 \text{ plus } (6\tfrac{1}{12} \times 1{,}000) = 56{,}083$$

That is, that on July 1, 1906, it is estimated that the population of the community in question would be 56,083.

This method is based upon ordinary arithmetical progression and is the simplest method known of computing the increase or decrease in the population. It is generally used by all health officials and recorders of vital statistics and is the method accepted by the government as giving a fairly exact indication of the population during any of the intercensal periods.

(b) *Geometrical Process.*—This method is based upon the principal of compound interest. That is, the increase in each intercensal year is compounded, and the additional increase found by this method added to the population. figures. These statistics are usually computed with a table of logarithms. They are used when greater accuracy is desired than may be obtained by the arithmetical method, although experience has shown that the arithmetical method is surprisingly accurate.

As both of the above methods are used in computing the population during intercensal years, and as the population, and the vital statistics based upon it, are reported on the basis of these figures, it may be seen that a readjustment in vital statistics must occur once each ten years when a new census is taken. This is true because the estimates of population for the intercensal years can be nothing more than estimates, and after the census has been taken, the actual population rather than the estimated one is used as a basis.

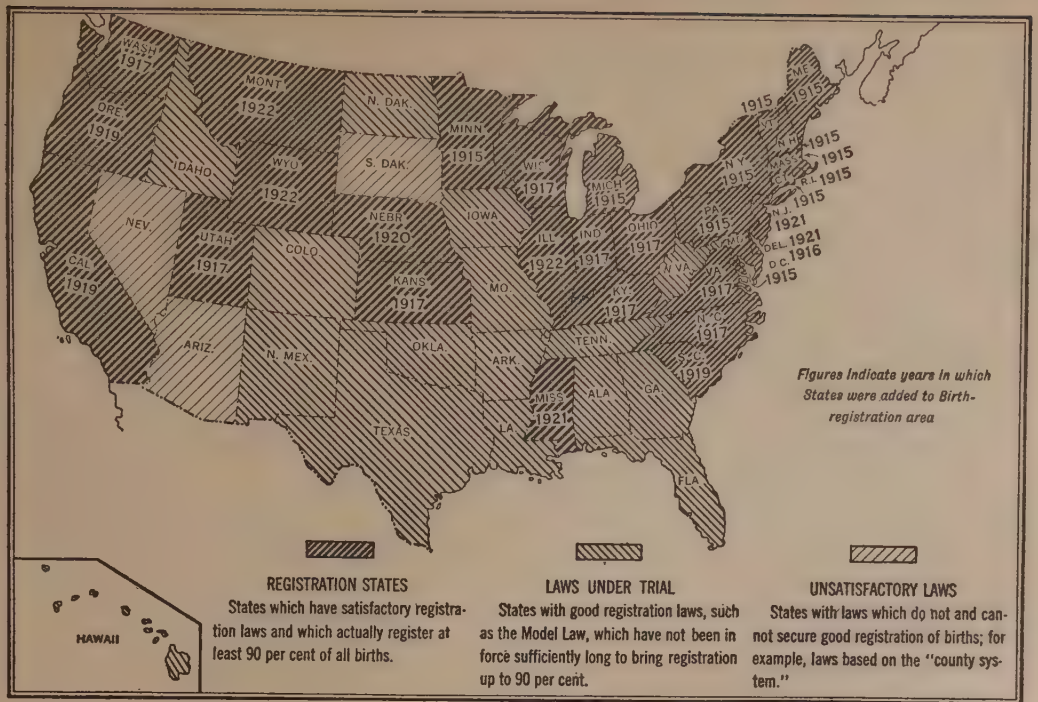
Marriage Statistics.—Marriage rates are of interest to the public-health officials, and particularly to anyone interested in child-hygiene work, because of their relation to birth rates, the number of children in each family, and the relation of illness or death in childhood to the number of other children in the family, and to the race or combination of races involved in the child's maternal and paternal ancestry. Marriage rates may be computed as the number of marriages for each 1,000 of the population. This is, however, not an accurate method. For instance, in some rural communities or small towns, particularly in our Eastern states, the population may consist very largely of people beyond marriageable age. In other communities of equal size, situated in some of the Western states, the population may consist almost entirely of people of marriageable age. Marriage statistics, therefore, based upon these two populations, could not be compared. It is the common practice to compute the number of marriages upon the basis of each 1,000 persons in the community who are unmarried, divorced, or widowed, of marriageable age, or between fifteen and forty-five years.

As the marriage rate is closely connected with the welfare of children, it is interesting for us to know the factors that might influence it: *Economic conditions.* In times of prosperity we always have an increased marriage rate. In fact, we can almost gauge the fluctuation in the economic conditions in a community by the difference in the marriage rate. Economic depression lowers the proportionate number of marriages that occur. The frequency of marriage is influenced by the demand for labor, the prevailing rate of wages, and the cost of living. The relation of the adopted standard of living to the average wage has an undoubted effect. In other words, while the wage rate in the community may be sufficient to meet ordinary family expenditures, based upon a decent scale of living, the demand for luxury and for a much higher standard of living conditions may preclude marriage and cause lower marriage rates.

Low marriage rates almost invariably result in low birth rates, and the countries which are facing a constantly lowering birth rate are the ones that are searching for some method whereby marriage may be made more possible and attractive. Generally speaking, marriage to-day takes place at a later period—that is, at a higher age than it did fifty or even twenty-five years ago. This is largely due to economic conditions, but we must also recognize the fact that delay in marriage is also often due to a desire for a high standard of living and luxury. The economic independence of women is a factor of great importance in the lowering of the marriage rate. High rents and increased cost of clothing and food must also be taken into consideration in determining the reasons for fluctuations in marriage rates. In the absence of other factors the marriage rate is usually a fair index of the relation of the average income to the standard of living.

The character of the population of the community also influences the marriage rate. It may be low in small industrial towns on account of the small number of marriageable women. It may be high in the cities because of the number of people who come to the city from the surrounding country to be married and begin their married life. Marriage rates, therefore, must be taken with some degree of reservation, and at the best are only an index. It has been stated by Dr. I. S. Falk that under the prevailing conditions of mortality a family of six persons—two parents and four children—is only very slightly larger than that which is necessary to merely maintain the population, without allowing for growth and increase.

Birth Statistics.—Accurate birth registration is the essential foundation for all effective efforts to reduce infant mortality. Such accurate registration of births has been common in most of the European countries. In the United States, however, we have been greatly remiss in our realization of the importance of registering the birth of every person born. Only within recent years has there been con-



BIRTH-REGISTRATION AREA: 1923

30 states, and the District of Columbia,
includes 72.2 per cent of total population of the United States

COMPILED BY
DEPARTMENT OF COMMERCE
BUREAU OF THE CENSUS
DIVISION OF VITAL STATISTICS
WASHINGTON

certed effort on the part of the government to make birth registration imperative. Probably many of the people now living, who are over forty years of age, would find it exceedingly difficult, if not impossible, to find any legal record of their birth. It is a curious commentary upon our attitude toward this matter to realize that we have long been in the habit of registering the pedigree of all valuable horses, cattle, dogs, and other animals, and we have recognized that this is essential in the matter of good breeding and the production of a good race stock.

Not many years ago, in one of our Western states, an action was brought to determine the age of a young woman. Upon establishing the correct day of her birth depended the inheritance or non-inheritance of a considerable amount of property. Both her father and mother swore that she was born on a certain date. This was not, however, acceptable legal evidence of age. Finally, the father established the fact that his daughter was born the day after the birth of a valuable calf. He produced his diary for that year and in it, under the appropriate date, was recorded the fact that he had, on that date, registered the birth of this calf with the proper authorities. This registration was confirmed, and the date of the girl's birth was established, only in its relation to that of the calf.

Value of Birth Statistics.—To the people in general and to public health officials, birth statistics are important for the following reasons:

1. For ascertaining the natural increase in population and the excess of births over deaths.

2. For obtaining information regarding the fertility or fecundity of various races, and for ascertaining the frequency of so-called "illegitimacy."

3. For furnishing a basis for studying the infant-mortality rate.

4. For ascertaining the location of births, so that in the efforts to reduce the infant-mortality rate the mother may be reached as soon as possible after the birth of the child.

5. For affording an opportunity of enforcing the regulations relative to the use of silver nitrate or a similar prophylactic solution for preventing ophthalmia neonatorum.

Although the reasons given for the necessity of accurate birth registration may seem to be conclusive, there are still further reasons why the registering of birth statistics is important. These relate to the value of such registration to each individual. The registration of births provides for the individual the following important information:

1. It gives a legal record of birth that may be used for all legal purposes.

2. It establishes the birth and parentage of the child and the question of its legitimacy.

3. It establishes the child's age for admission to school. This legal evidence is required in practically every state.

4. It establishes the legal age when a child may work in those states having child-labor laws.

5. It gives legal evidence as to the age when the child may leave school.

6. If the child is a female, birth registration will establish the legal age at which such child may be held responsible for her own welfare. This is of particular importance in those states that have laws relating to the so-called "age of consent" or the age below which any sexual assault may be punished, or above which it may be considered as having occurred with the consent of the girl.

7. It shows when individuals have attained the age when they may marry without the consent of their parents.

8. It establishes the legality of the date upon which a person becomes of age, which is usually placed as occurring on the twenty-first birthday.

9. It establishes a legal age in connection with the granting of pensions, military and jury duty, and voting.

10. It is valuable for use in connection with the bequeathing and inheritance of property.

Birth Registration Area.—There are at present thirty states, besides the District of Columbia, in the birth-registra-

tion area of the United States. These states include 72.2 per cent of the established population of the United States. They are California, Connecticut, Delaware, Indiana, Illinois, Kansas, Kentucky, Maine, Maryland, Massachusetts, Michigan, Minnesota, Mississippi, Montana, Nebraska, New Hampshire, New Jersey, New York, North Carolina, Ohio, Oregon, Pennsylvania, Rhode Island, South Carolina, Utah, Vermont, Virginia, Wyoming, Washington and Wisconsin.

To be admitted into the birth-registration area the birth-registration law must be satisfactory to the Bureau of the United States Census. Tests made by the Census Board must show that the birth registration in the indicated states is at least 90 per cent complete. The procedure necessary is for the state-registration officer to ask the Bureau of the Census to make a test of birth registration. Such a request is granted if the Bureau of the Census considers that there is a reasonable prospect that such a test would show the birth registration about 90 per cent complete. While it is not required that a birth-registration state shall be in what is known as the "death-registration area," it is a fact that no state has been admitted to the former classification unless it has already been received into the death registration area.

Facts Influencing Birth Rates.

1. The number of women, particularly married women of child-bearing age, in the population. The child-bearing age is considered as between fifteen and forty-five years.

2. The economic and social status may affect the birth rate. This is not in the same sense as it affects the marriage rate, for in nearly all countries the poorer families have more children per family than the well-to-do. In fact, the number of children in a family seems to be in inverse proportion to the family income. This is probably one of the reasons why high birth rates are usually accompanied by high infant death rates, and, conversely, why low birth rates are usually accompanied by low infant death rates.

Computation of Birth Rates.—Birth rates are usually expressed as the number of births occurring during the year per thousand women of child-bearing age. For this purpose the female population between the ages of fifteen and forty-five is determined from the census enumeration. Occasionally, birth rates are expressed in terms of the number of legitimate births or babies born as the result of marriage per thousand married women of child-bearing age, and the number of so-called "illegitimate births" per thousand unmarried women of this age.

Methods of Checking Up Birth Registration.—The following will be found of value for use in any effort to make the birth registration of a community complete:

1. Notices of births appearing in newspapers. Each birth so recorded should be investigated in order to determine if proper birth registration has been made.

2. An investigation may be made of all deaths occurring under one year of age to see if the births were reported.

3. An investigation of the birth registration of all babies under the care of all baby health stations and all social-service agencies of every organization.

4. An investigation of all christenings reported by churches.

5. The obtaining of lists of names of babies or mothers of new-born babies from dealers in babies' supplies. The latter may be asked to keep a record of all sales of baby carriages, layettes, cribs, or other articles for infants, and to report same to the local registration authorities for verification of the reporting of the birth.

6. Perhaps the best method, and the one that at the same time most effectively promotes birth registration, is the following: immediately upon receipt of each birth certificate, the local registration office should mail to the mother a copy of the birth certificate. Inclosed with it may be a pamphlet on infant care. It has been a common experience, where this method has been followed, that mothers failing to receive such certificates make prompt inquiry to find out

the reason why. This leads inevitably to a search of the records, and if it is found that the birth has not been reported, it is easy to determine the reason for this negligence. Such a method of stimulating doctors and midwives to the accurate reporting of births has been found most effective. The pressure of reporting the birth usually comes from the parents and there is seldom any need for legal action.

7. Penalties for failure to report births, or even fines or imprisonment therefore, may be the result of action on the part of the registration authorities toward delinquent physicians or midwives. If the other methods suggested are carried out with any degree of thoroughness, it is rarely necessary to take any drastic legal action.

Morbidity Statistics.—These are statistics of the occurrence of illness. They would be of great value if any method had been found for securing such figures in sufficient number or with sufficient accuracy to make them usable. As a general rule, morbidity statistics are poorly collected and cannot be used as a basis for health work, except in cases of infectious or contagious diseases. The public health authorities have a legal right to enforce the reporting of the latter types of illness. Such statistics are used as a basis for public-health work for the control of cases of illness from communicable diseases, and are of extreme significance and importance.

Mortality Rates.—Mortality or death rates are usually expressed as the proportion of the total number of deaths compared with a unit of the population. For example, the usual method is to express these death rates in terms of the number of deaths per 1,000 population. If the death rate is low, it may be expressed in terms of 10,000 or even 100,000 of the population.

What are called "crude death rates" show the proportion of all deaths to the total population. They are obtained by dividing the total number of deaths by the total population in thousands. A city having a total of 900 deaths during

the calendar year and an estimated population of 600,000 in the year in question, would compute its crude death rate as follows:

$$900 \text{ divided by } \frac{600{,}000}{1{,}000} = 1.5$$

Thus the death rate of the population in question would be expressed as 1.5 per 1,000.

Death rates may be computed by years, by fourths of a year, or by months. Shorter periods are of little value on account of the accidental fluctuations in the causative factors in the occurrence of deaths. There are times, however, when one wishes to record the death rate of a community by weeks. This is usually for the purpose of making charts and graphs to show the rise and fall of such rates. Such compilations may be made as follows: Example—if in a city there were 20 deaths during a given week and the population of the city was 60,000, the crude death rate could be computed as follows:

$$20 \times \frac{365 \text{ (days in year)}}{7 \text{ (days in week)}} \text{ divided by } \frac{60{,}000}{1{,}000} \text{ (population of city in thousands) equals } 17.38$$

Infant Mortality.—The question of infant mortality will be discussed in this chapter only as it relates to vital statistics. The significance of these statistics and their use in child hygiene will be considered, with all the other factors bearing upon infant mortality and its prevention.

Infant mortality has to do with the deaths of infants under one year of age. There has been much difficulty in obtaining accurate figures as to the exact infant population at any one time. For example, the census figures may report infants as one year of age when the probability is that they are less than twelve months old. Such figures, therefore, usually underestimate the infant population because of the confusion in the public mind of the current year of age with the completed year of life. Infant mortality rates in

the birth-registration area are based upon the number of reported births; that is, the number of deaths of infants under one year of age in proportion to each 1,000 recorded births. While these figures cannot be taken as representative of the country as a whole, the fact that the birth-registration area comprises 72.2 per cent of the estimated population of the United States gives us sufficient ground for the assumption that infant mortality rates in the other states, if they could be ascertained, would not make any perceptible difference in the percentages which are found in the birth-registration area.

While it is the common practice in this country to base infant-mortality rates upon the number of births occurring in the same year, a more accurate method would be to take the number of children born in any given year and, at the end of one year, to compute the number of such children who had died. This latter method, however, offers so many difficulties that it is rarely used, notwithstanding its greater accuracy. The computation of infant-mortality rates in any one calendar year, based upon the number of infants born during that year, is generally accepted in this country and in Europe.

Method of Computing Infant-mortality Rates.

Example: If in a city there were during a year 224 deaths of infants under one year of age, and if during the same period there were 2,000 births, the baby death rate would be computed as follows:

$$224 \text{ divided by } \frac{2{,}000}{1{,}000} = 224 \text{ divided by } 2 = 112$$

That is, the infant-mortality rate for this community would be 112 per 1,000 births per year. The rule is as follows: Divide the number of infant deaths by a fraction consisting of the number of births for the numerator and 1,000 for the denominator. The answer will be the rate of infant deaths per 1,000 births.

If infant death rates are to be computed for a period less

than one year, the method and formula given under the paragraph on the computation of death rates may be used, with the substitution of the number of births in place of the population.

Records and Record-Keeping.

Records.

Accurate records of the amount and type of work performed, of results achieved, and of costs are essential for a proper evaluation of the efficiency of a child-hygiene program, just as they are in any other type of public-health work or any commercial activity. In child hygiene we may consider that records are necessary

(a) to plan work;
(b) to show progress;
(c) to determine results;
(d) to check up the workers.

Statistics of child hygiene have been misleading in the past, and are so to a great extent at the present time. The lack of any standards on which the records were based, the impossibility of comparing any one community with another because of the difference in standards, and the resultant confusion as to the exact value of any type of work are all deplorable. It is only within recent years that it has been possible in the United States to furnish accurate records and to draw deductions from the infant-mortality rates as published. The extension of the birth-registration area has given us a basis for computing this rate upon the number of reported births, so that in this particular instance we have made progress. The various varieties of record-keeping, however, still leave us in the dark as to the comparative efficiency of methods employed in various communities in reducing the baby death rate, and to an even larger extent this confusion still exists with regard to all the other types of child hygiene work, with particular reference to school medical inspection.

Types of Records.—The type of record-keeping in child hygiene work is not different basically from that of the

keeping of other public-health records, but there are certain points that should be accentuated. Probably one of the greatest contributions that could be made to our child-hygiene program is the standardization of records and record-keeping for each of the various activties included under this head.

The following suggestions, therefore, pertain particularly to records and record-keeping in child-hygiene work.

Records Should Be Simple.—Nearly all records and record-keeping are too complex. As a result they are expensive to print and the filling out of such records consumes time of the employees that might more profitably be spent in other directions. It is important that we should see that no worker in the child-hygiene field spends an undue amount of time on record-keeping. In the desire to be accurate and comprehensive there is a tendency to fill record cards with too many questions. There should be no questions or printed matter of any other kind on the record card that can be consistently omitted.

Records Should Be Accurate.—Careful consideration must be given to the separation of the types of questions that can be answered by (a) actual facts, capable of being verified by the person filling out the record card; (b) information obtained from the person questioned. Such information may be based upon opinions or memory, and may or may not be accurate.

It would be well if all record cards were made to contain only the information noted under (a). Statistics based upon the type of information noted under (b) have been published, with the inference that they might be taken as accurate. The following types of information are usually misleading and inaccurate, and should not be used as a basis for child-hygiene programs: (a) history of the character of previous pregnancies, to be used as a basis for proper prenatal care; (b) previous health histories of infants and children; (c) information given as to the hygiene of the home, including answers to the questions as to

whether windows are kept open in bedrooms at night, the type of food which the child eats, the hours of play and sleep and others of this character. In this connection I might cite a personal experience.

Some years ago, when investigating causes of infant mortality, I visited the mothers of five hundred babies who had died of diarrhœal diseases. The questionnaire which I desired to fill out included information as to the feeding and general hygiene of the child. I found that in almost every instance the mothers would insist that the babies had been breast fed, that they had been taken out-of-doors daily, that their habits were regular, and that every proper method of baby care had been followed. The compilation of these answers showed an apparent condition which would lead us to suppose that if babies were breast fed and given the right kind of care they were likely to die from some form of diarrhœal disease. I next visited, in the same districts covered by the former investigation, five hundred mothers of babies who were alive and well. The same questions as in the previous survey were asked in each instance. Invariably, the mothers would reply to the question about feeding, with some such remark as, "I give the baby anything that he wants to eat and nurse him when he is hungry. As you see, he is perfectly well," or, "I take the baby outdoors when I am not too busy." A compilation of the answers to this group of questions apparently showed that in order to keep a baby alive and well one might, and reasonably should, disregard all methods of proper baby care.

The reasons for these conflicting answers are, of course, easy to determine. In the case of the dead babies the mothers were on the defensive and feared criticism. They therefore made out just as good a case as they could for themselves. In the case of the well babies the mothers were given to boasting, and in order to show that they knew more about baby care than the investigator did, they went to the

extreme of claiming a lack of care which in all probability was not based upon fact.

The primary requisites of a good record card are, therefore, (a) simplicity and (b) accuracy.

Forms of record cards are generally of three types:

(1) *Individual Record Cards.*—Each of these cards should contain information relating to some one baby or child. They may be of various forms, such as the cards used in the baby health stations to record the care and progress of the baby, and the child's individual health-record card in school, which may be kept in the classroom or in the principal's office. Such records also include the type that may be used to show the history, equipment, and character of work performed by a midwife. Such cards are necessarily personal. They should have frequent entries made upon them, and in the case of children such a card should be continuously in use from birth to adolescence. If single record cards are not considered practical for this purpose, a record book or series of cards that may be fastened together will be found useful. The point to be remembered with regard to the individual record card is that in order to have any value it must contain the history and every fact relating to the health progress of the child or other person concerned.

(2) *Work Cards.*—This type of record may be compared with the day book in bookkeeping. It should show the type of work that is in progress from day to day. Example: these cards are the kind that are made out by doctors or nurses showing the information obtained from visits made each day to babies or children, or the class index cards that show the health of the children in each classroom. These cards are necessarily temporary in character. The data on them are later transferred to the individual record cards.

(3) *Report Cards.*—This type of record card is one that shows each day the character and amount of work performed by the person who fills it out. Such record cards are usually sent in either daily or weekly to the central office of the

organization, and the data on them are used for tabulation purposes.

Statistical records of the extent and character of illness, of the relation of feeding and environment to health, and the possible etiology of abnormal conditions in childhood, will be obtained from the individual record card. Work cards will be found of great value in determining the health status of children at any one time. The report cards are essential for checking up work performed and they are also used as a basis for the computation of the cost of such work and for the preparation of a budget.

Special Suggestions for Records

Records of Infant Care.

1. Do not make the error of entering as new cases those babies who have been absent from the health station for a temporary period and are then readmitted.

2. Always note the type of feeding the child is having at the time it is first registered.

3. Note age at time of admission.

4. Make a record of the sex of the child.

5. Note the country in which the mother was born.

6. Always note termination of the case; that is, the date upon which the baby ceases to attend the baby health station or to remain under supervision.

7. Have a graphic form showing the normal weight curve for babies. Keep the individual baby's weight curve up to date on the same record form, so that the mother may note whether her baby is losing or gaining.

8. All data which pertain to improved conditions in the child should be entered on the record card in black ink. Any illness or lack of improvement should be entered in red ink. Any treatment given by the doctor or nurse should be entered upon the card.

School Health Cards.

1. The health history of each child should be exceedingly simple and short, including the date of the occurrence of any infectious or contagious disease with its character; the date

of any vaccination, the country of the birthplace of the mother, and the age and sex of the child.

2. The school card should contain sufficient space in the proper blanks for recording the condition of each child each year. This should include.

(a) the type of mental or physical defect found;

(b) whether or not treatment is received for this condition;

(c) the character of the treatment;

(d) the condition of the child on re-examination after treatment has been instituted;

(e) the final termination of the case as shown by care, improvement or lack of improvement;

(f) space for recording the date and character of any infectious or contagious disease occurring while the child is under observation.

3. The individual health record card of the child should, if possible, be printed on the reverse side of the child's school-record card and should accompany the child from class to class throughout the entire school life.

Tabulation Sheets.—These should follow the form of the individual health-record cards and be made up each day in the baby health station or school to show the health status of all children in school on the date in question. Such sheets are for the information of the parents and teachers and will be found of great value.

Codes.—For the sake of brevity it is well to use codes in recording health data on the various forms of record cards. Such codes are easily made up by using a letter or symbol to designate a type of improvement or a disease. As an example, on the individual health-record cards, the following code may be used:

\+ equals "well" or "improved"
− " "delicate"—"unimproved"
s " "sick"
√ " "defect found"
O " "operation"
M " "medical"

I	"	"institution"
D.D.C.	"	"department dental clinic"
D.M.C.	"	"department medical clinic"
P.	"	"private physician"
R.	"	"refused treatment"
G.	"	"glasses"
D.	"	"dentist"
OK.	"	"corrected" or "cured"

Combinations of these letters may be used, as follows: To indicate that a child had obtained surgical treatment from a private physician and was well, the symbol would read OP+. Any variety of symbols may be used and an unlimited number of combinations worked out from them.

It is advisable in many instances to use symbols or numbers to indicate the character of contagious and infectious diseases, particularly the infectious eye and skin diseases. In order that the attention of the whole class in school may not be drawn to the fact that the school doctor or nurse is stating that the child has an infectious skin disease, the use of a number for this purpose will be found almost essential. Such codes can readily be made by anyone. The one in use in New York City is as follows:

1. Diphtheria	10. Measles
2. Pediculosis	11. Varicella
3. Tonsillitis	12. Pertussis
4. Pediculosis	13. Mumps
5. Acute conjunctivitis	14. Scabies
6. Pediculosis	15. Ringworm
7. Trachoma	16. Impetigo
8. Pediculosis	17. Favus
9. Scarlet fever	18. Molluscum contagiosum

19. Acute coryza

It is necessary to change these codes from time to time as the children become familiar with the meaning of the different numerals.

Tabulations of all recorded work should be made at stated periods. These may be weekly, monthly, quarterly, or yearly. Usually it will be found desirable to have these

tabulations completed each week. For ease in recording data upon the tabulation sheets the latter should follow the same form as the smaller record cards from which the information is to be tabulated.

Two Common Errors in Tabulation to be Guarded Against.

1. Entries pertaining to any one fact must not be recorded more than once.

2. Avoid the common error of recording as "children examined" or "children visited" the data which relate to the *number* of examinations made or *number* of visits made. There is a sharp differentiation between the number of children examined and the number of examinations made of children. Much confusion has arisen in the past because of the tendency to consider these as the same thing.

So far, no standard form of record cards has been devised for any type of child-hygiene work. There are many excellent ones in use. There can be no question as to the desirability of using standard forms, so that data may be easily comparable. In some states an effort has been made in this direction, notably in New York, where the Children's Welfare Federation, which is a clearing house for all child-welfare organizations in that city, has prepared standard forms to be used in prenatal work, baby-health-station service, and for the child of preschool age. Further standardization of health-record forms is in progress under the auspices of this federation. This attempt is local, but it is significant. It is probably true that no one form of record card could be made that would satisfy the needs of large cities and rural communities alike, but it is possible to make satisfactory record forms for use in cities and others for use in communities of other types. This problem of proper standardization of record forms to be used in child-hygiene work is one that is urgent in requiring a solution. Such standardization must come by the action of some department of the federal government or that of some popular nation-wide association. Possibly a combination of the two will

be effective. Such standardized forms, of course, would not have to be used by any community, but it is evident that the extension of their use would be of great value in making statistics comparable.

For obvious reasons it is not within the province of this book to give in detail the type of record form that would be found most useful for any community.

Surveys.—Before any program of child-hygiene work may be applied to a community it is necessary to have the facts at hand upon which such a program may be based. The facts needed may be placed under two general headings: (1) accurate vital statistics; (2) knowledge of all social, economic, sanitary, racial, and other factors which relate to or have any bearing upon the health of the community.

In order to obtain the information mentioned under (2), surveys of local communities are generally necessary. Such surveys may be made by groups of interested citizens. The inspiration for them may come from an individual, a women's club, the chamber of commerce, churches, parents' associations, the newspapers or national organizations having local chapters, such as Kiwanis clubs, Rotary clubs, the Elks, the Order of Moose, and so on. In making a sanitary survey of a community, the type of information to be obtained must be clearly kept in mind. Such surveys may be either exceedingly comprehensive, and therefore expensive and time-consuming, or they may be the type of survey that works on one definite feature and includes information that may be readily obtained within a short space of time and by untrained workers.

A notable example of a state child-welfare survey was the one that was carried under the direction of the New York State League of Women Voters in 1922. This survey was made possible by the large membership of this organization and its distribution in all communities of the state. Questionnaires on infant care, on school hygiene and school health supervision were sent out from the central office of

the league to the county chairman. The latter distributed them among interested workers, including not only members of the league, but also members of women's clubs and other organizations. The purpose of this survey was

(1) to obtain information regarding the status of child care in New York State;

(2) to obtain suggestions for changes or improvements;

(3) to organize an intelligent body of public opinion that would be prepared to obtain the necessary legislation and appropriations for the satisfactory protection of child welfare and health.

The results of this survey have been printed, and its form and methods are suggestive for use by other states.

In 1920, a hospital and health survey was made of the city of Cleveland, Ohio, under the supervision of Dr. Haven Emerson. Part III of this survey, as published, is entitled "A Program for Child Health." Copies of this report may be obtained from the Cleveland Hospital Council, Cleveland, Ohio. The Cleveland child-health program is necessarily based upon local conditions, but may serve as a suggestion for making surveys of similar nature, with constructive suggestions as to the organization of child-health work in a community. Its main feature is the effort that has been made in the program to correlate the work of all existing agencies doing child-welfare work, whether public or private, to eliminate duplication and to so shape the work that it will be a constructive program covering community work for child health from the prenatal period to adolescence.

Local Surveys.—Possibly the easiest and most direct way to stimulate interest in child-welfare work in any community is to obtain and publish information regarding infant mortality. This information is of value, not only for purposes of publicity and the obtaining of financial support, but it is also the basis upon which any kind of work for the reduction of the infant death rate must rest. A child-welfare survey in a community may well start with this as its first feature. Often information regarding infant sickness

and death may be obtained from the local official who is in charge of the registration of births and deaths. It may, however, be necessary to make visits to each individual home in which a death has occurred in order to obtain the essential data regarding the character and duration of the fatal illness.

Surveys to determine race groupings, congestion of population, localities in which sickness or death in infancy or childhood occurs most frequently, the location of parks and playgrounds and other recreational facilities, the opportunities for clean and decent living and other factors relating to child welfare, will readily suggest themselves. Questionnaires should be made out for each type of information that is sought. While the character of the information obtained may be more accurate if it comes through the medium of trained workers, we must consider the value of an informed public opinion as being so great that the stimulation of it probably outweighs all other considerations. Therefore, the use of volunteer workers in making such surveys will be found of extreme value. Their findings can be checked up later, but the general trend of information will be found sufficiently sound to be used as a basis for proceeding further. The fact that a large group of citizens have become interested in the problems of child health as they are occurring in their own community is the most valuable foundation upon which to build a sound program for correcting any wrong conditions that may exist. Only by means of this public opinion can sufficient funds be obtained and only with the backing of public opinion can the work be carried on successfully.

Use of Charts, Graphs, and Pin Maps.—Information, however valuable it may seem, is of little use for community purposes unless it can be visualized. In order to visualize statistics it is necessary to present them in such form that they may be readily understood and attract attention. Tables of figures are dull reading and few people are willing to take the trouble to understand them. Vivid representation of these facts, however, is an easy matter. The

forms that may be used for this purpose are almost innumerable. We have already spoken of posters containing attractive figures. The use of figures to represent relative numbers or percentages has been found of great value. Such methods were made particularly familiar during the war. One of the simplest ideas is to draw figures of children of different heights, the larger figure to represent, for instance, the total number of children examined, the smaller to show how many had physical defects. The figures should be drawn in relative proportion so that they may illustrate graphically the difference between the two totals. This idea may be carried out in many forms. Large and small bottles of milk may be pictured to show the difference between the total milk supply and the amount that is pasteurized. Figures of babies of varying size may be used to illustrate, year by year, the variation in the infant death rate. Many other suggestions will come naturally to those interested in any particular subject.

The ordinary form of chart or graph may consist of a number of vertical or horizontal lines drawn to a scale, and may represent by their number or length either total numbers or percentages, so that one may see at a glance the relative difference in the numbers represented. (See pages ....). The line chart, which is modeled on the well-known temperature chart, is of great value in showing the progress of any type of work, and also may be used to show morbidity and mortality statistics as they occur from week to week.

The circle is one of the most interesting forms of graphic representation. It is usually considered as representing the whole, or 100 per cent. It may then be ruled off in triangular divisions from the center to the circumference, each section representing a percentage of the whole. These circles are generally used to show budget expenditures, showing how each dollar is spent. They may also be used to show racial distribution, and are particularly attractive if the sec-

tions are of different colors, one color representing each race group. (See page . .).

Pin maps are a common form of visual representation of statistics. They make an immediate appeal to the public and are usually more readily understood than many forms of charts or graphs. In order to construct a pin map an ordinary map of the community, about 2 x 4 feet in size, should be tacked to a piece of compo board. Pins with large heads of different colors are used. In constructing a map to illustrate births and infant deaths, a pin with a white head should be stuck in the map at the exact location where the birth occurs. Deaths are illustrated by using pins with different colored heads to show the cause of death—red for contagious disease, yellow for diarrhœal disease, green for deaths from respiratory diseases, blue for congenital diseases, and black pins for deaths from all other causes. These maps are usually arranged to cover a definite length of time. They may be commenced at the beginning of the year and pins added as births and deaths occur. From such a map one is able to see at a glance the approximate number of births and just where they have occurred, also the approximate number of deaths from each type of illness, where these deaths have occurred, and any grouping of deaths that might have significance. Such maps are of particular value for persons who are engaged in child-hygiene work. For a busy executive they furnish one of the easiest methods of determining each day the exact situation in any locality. For a more intimate knowledge of the situation these maps may be used to show the births and deaths occurring in one week. The pins may then be removed and a new week's record begun.

CHAPTER V

THE MOTHER

Maternal Mortality

"He who helps a child helps humanity with an immediateness which no other help given to human creature at any other stage of human life can possibly give again."—Phillips Brooks.

Definition: Maternal mortality relates to the death of women from accidents or diseases connected with pregnancy or childbirth.

Extent of Maternal Mortality in the United States.—In a list of 22 nations of the world, made up by the Children's Bureau of the Department of Labor, from the latest figures available up to September 1, 1923, the United States occupies the twentieth position; that is, there are nineteen countries in the world that have lower maternal mortality rates than the United States only 2 countries—Belgium and Chile—have higher rates.

In the age group of women from fifteen to forty-five years of age—which is considered the child-bearing period—there are in the United States more deaths from accidents and diseases due to childbirth than from any other cause except tuberculosis. In other words, during this age period, maternal mortality ranks as the second highest cause of death. The United States has every reason to feel ashamed of its relative position in this regard. The maternal mortality rate in the United States is an indictment of our civilization, the more so because we know the way in which it could be reduced, and also because lack of proper facilities for care during the prenatal period and at the time of child-

birth is the responsibility of the public, and in the final analysis cannot be considered as reflecting upon the individual mother or family.

The latest figures given out by the Department of Commerce relative to death rates of mothers from childbirth are those of the year 1922. These show that during that

MATERNAL MORTALITY RATES IN THE UNITED STATES AND CERTAIN FOREIGN COUNTRIES

Country and Year	Deaths from puerperal causes per 1,000 live births
Denmark (1921)	2.0
The Netherlands (1921)	2.3
Sweden (1917)	2.5
Italy (1917)	3.0
Norway (1917)	3.0
Uruguay (1920)	3.4
Japan (1921)	3.6
Union of South Africa (1919)	3.9
England and Wales (1921)	3.9
Hungary (1915)	4.0
Finland (1918)	4.4
Australia (1921)	4.7
Germany (1918)	4.9
New Zealand (1921)	5.1
Spain (1915)	5.2
Ireland (1920)	5.5
Switzerland (1915)	5.5
France (1914)	5.7
Scotland (1919)	6.2
United States Birth Registration Area (1921)	6.8
Belgium (1919)	7.2
Chile (1920)	7.5

Source: Compiled from official sources or from *Annuaire International de Statistique.*

Latest figures available September 1, 1923.

Death Rates from Puerperal Causes per 1,000 Live Births in the Birth-Registration Area and Each Registration State: 1915 to 1922

Area	Death rate per 1,000 live births																							
	All puerperal causes								Puerperal septicæmia								Other puerperal causes							
	1922	1921	1920	1919	1918	1917	1916	1915	1922	1921	1920	1919	1918	1917	1916	1915	1922	1921	1920	1919	1918	1917	1916	1915
The birth registration area	6.6	6.8	8.0	7.4	9.2	6.8	6.2	6.1	2.4	2.7	2.7	2.5	2.3	2.7	2.5	2.4	4.2	4.1	5.3	4.9	6.6	5.9	5.7	3.7
The birth registration area as of 1915[1] (excluding Rhode Island)	6.2	6.5	7.6	6.8	8.5	6.5	6.2	6.1	2.2	2.6	2.6	2.3	2.3	2.6	2.3	2.4	4.0	3.9	5.1	4.5	5.6	3.7	3.7	3.7
REGISTRATION STATES																								
California	7.2	6.8	7.7	8.0	(2)	(2)	(2)	(2)	2.6	3.0	2.6	2.5	(2)	(2)	(2)	(2)	4.6	3.9	5.1	5.5	(2)	(2)	(2)	(2)
Connecticut	5.7	5.3	6.8	6.2	7.5	3.1	4.5	5.6	2.0	2.2	2.2	2.0	1.5	2.1	2.1	1.9	3.7	3.1	4.6	4.2	6.0	5.0	2.8	3.7
Delaware	6.6	6.3	(2)	(2)	(2)	(2)	(2)	(2)	3.0	3.0	(2)	(2)	(2)	(2)	(2)	(2)	3.6	3.4	(2)	(2)	(2)	(2)	(2)	(2)
Illinois	6.3	(2)	(2)	(2)	(2)	(2)	(2)	(2)	2.4	(2)	(2)	(2)	(2)	(2)	(2)	(2)	5.9	(2)	(2)	(2)	(2)	(2)	(2)	(2)
Indiana	6.6	6.9	8.7	8.4	10.4	7.2	(2)	(2)	3.1	3.4	4.0	5.6	4.2	3.6	(2)	(2)	5.5	3.5	4.7	4.3	6.2	3.7	(2)	(2)
Kansas	7.6	6.4	8.4	8.2	11.4	7.6	(2)	(2)	3.3	2.9	3.5	3.1	4.3	3.4	(2)	(2)	4.3	5.6	5.6	5.1	7.1	4.3	(2)	(2)
Kentucky (total)	6.1	6.3	6.4	6.5	8.0	6.0	(2)	(2)	2.8	2.9	2.8	2.3	2.7	2.7	(2)	(2)	3.3	3.3	3.7	4.0	5.3	3.3	(2)	(2)
White	5.4	5.7	6.0	5.5	7.5	5.6	(2)	(2)	2.4	2.6	2.5	2.0	2.5	2.5	(2)	(2)	3.0	3.0	3.5	3.8	5.0	3.1	(2)	(2)
Colored	18.5	14.3	13.0	12.5	15.4	10.8	(2)	(2)	9.4	7.0	7.0	6.1	5.3	5.6	(2)	(2)	9.1	7.7	6.0	6.4	10.1	5.2	(2)	(2)
Maine	7.6	7.4	8.5	8.6	8.6	6.7	7.8	6.8	2.1	1.9	1.6	1.5	1.5	1.8	1.5	2.1	1.5	5.5	6.0	6.5	7.3	4.5	5.5	4.7
Maryland (total)	3.9	6.7	7.6	8.4	9.5	6.8	6.4	(2)	2.0	2.4	2.4	2.7	2.5	2.6	2.7	(2)	3.9	4.3	5.2	5.7	7.0	4.2	3.7	(2)
White	5.3	6.0	6.6	7.6	8.6	6.1	5.6	(2)	1.6	2.0	1.8	2.4	2.0	2.2	2.4	(2)	3.7	3.9	4.8	5.2	6.6	3.9	3.2	(2)
Colored	8.4	9.6	11.8	11.5	13.8	9.8	9.8	(2)	3.6	3.7	5.0	4.0	4.9	4.5	4.3	(2)	4.8	5.9	6.8	7.5	8.9	5.3	5.5	(2)
Massachusetts	6.8	6.5	7.5	7.1	9.2	6.5	6.0	5.7	2.1	2.2	2.4	2.1	2.1	2.7	2.4	1.7	4.6	4.3	5.1	5.0	7.1	3.8	3.5	4.1
Michigan	6.9	6.9	9.3	7.7	8.6	7.1	6.8	6.7	2.5	3.1	3.4	3.0	2.6	3.3	3.1	2.5	4.3	3.8	5.9	4.8	6.0	4.2	3.7	4.1
Minnesota	4.9	5.7	7.9	6.7	7.8	5.6	5.5	5.2	1.8	2.6	2.9	2.0	2.1	2.4	2.1	1.8	3.1	3.0	5.0	4.8	5.7	3.1	3.3	3.4
Mississippi (total)	8.3	8.5	(2)	(2)	(2)	(2)	(2)	(2)	2.7	3.1	(2)	(2)	(2)	(2)	(2)	(2)	5.6	5.4	(2)	(2)	(2)	(2)	(2)	(2)
White	6.5	7.1	(2)	(2)	(2)	(2)	(2)	(2)	1.8	2.2	(2)	(2)	(2)	(2)	(2)	(2)	4.6	4.9	(2)	(2)	(2)	(2)	(2)	(2)
Colored	10.0	12.0	(2)	(2)	(2)	(2)	(2)	(2)	3.6	4.0	(2)	(2)	(2)	(2)	(2)	(2)	6.5	8.0	(2)	(2)	(2)	(2)	(2)	(2)
Montana	7.5	(2)	(2)	(2)	(2)	(2)	(2)	(2)	3.8	(2)	(2)	(2)	(2)	(2)	(2)	(2)	4.1	(2)	(2)	(2)	(2)	(2)	(2)	(2)
Nebraska	5.8	6.6	7.1	(2)	(2)	(2)	(2)	(2)	2.3	2.7	2.5	(2)	(2)	(2)	(2)	(2)	3.5	3.9	4.7	(2)	(2)	(2)	(2)	(2)
New Hampshire	6.5	6.2	7.1	8.0	7.8	7.0	7.2	6.1	0.9	1.7	1.3	1.9	1.7	2.1	2.2	1.9	5.5	4.5	5.8	6.0	6.1	4.9	5.1	4.2
New Jersey	6.4	5.9	(2)	(2)	(2)	(2)	(2)	(2)	2.6	2.4	(2)	(2)	(2)	(2)	(2)	(2)	3.8	3.4	(2)	(2)	(2)	(2)	(2)	(2)
New York	6.0	6.3	6.9	6.2	8.0	5.7	5.4	5.9	2.2	2.5	2.3	2.1	2.1	2.3	2.2	2.6	3.8	3.8	4.6	4.1	5.9	3.4	3.2	3.3
North Carolina (total)	8.0	7.3	10.0	9.3	10.8	8.2	(2)	(2)	2.0	1.9	2.1	1.9	2.1	2.2	(2)	(2)	6.0	5.5	7.9	7.5	8.7	6.0	(2)	(2)
White	7.0	6.1	8.6	8.2	9.4	6.8	(2)	(2)	1.6	1.4	1.7	1.3	1.5	1.6	(2)	(2)	5.5	4.7	6.9	5.7	7.9	5.2	(2)	(2)
Colored	9.5	10.2	13.2	11.8	13.9	11.5	(2)	(2)	2.8	3.0	3.0	2.9	3.3	3.6	(2)	(2)	7.2	7.2	10.1	8.9	10.6	7.8	(2)	(2)

[1] From the Bureau of the Census—U. S. Dept. of Commerce.

year there was a gratifying decrease in these death rates, although the relative position of the United States in regard to these mortality rates remains unchanged. The Department of Commerce reports that "for the 9 states and the District of Columbia (constituting the birth-registration area of 1915, exclusive of Rhode Island) the death rate from puerperal causes in 1922 was 6.2 per 1,000 live births as compared with 6.5 in 1921, 7.6 in 1920, 6.8 in 1919, 8.9 in 1918, 6.3 in 1917, 6.2 in 1916, and 6.1 in 1915. The ratio of deaths from childbirth to the number of women bearing children in 1922 was 1 to 150. Of the thirty states for which figures are available, South Carolina has the highest death rate from puerperal causes (10.7 per 1,000 live births), and Minnesota the lowest (4.9). Separate rates for the white and colored are shown only for the six states of Kentucky, Maryland, Mississippi, North Carolina, South Carolina and Virginia. For 1922 the highest rate for the white appears for South Carolina (8.5) and the lowest (5.3) for Maryland, while for the colored the highest rate (18.5) is for Kentucky and the lowest (8.4) for Maryland."

Causes of Maternal Mortality.—It would be easy to draw an indictment of our entire obstetrical practice in the United States, of the lack of proper prenatal care and of our ignoring the devastation that is wrought by the large number of untrained and unsupervised midwives. It has been well demonstrated that these are the three basic causes of our excess of maternal deaths.

Physicians and Obstetrics.—It seems hardly necessary to review the present state of obstetrical teaching in our medical schools. The medical profession, particularly that group who are concerned with the teaching of medical students in the schools, are keenly alive to the weakness of this part of the curriculum. Didactic teaching of obstetrics seems to be, on the whole, fairly well carried out, but the opportunities for practical undergraduate experience are either limited or the students' time and opportunities are

so arranged or restricted that, even when facilities are available, they are only too often neglected. It is probably fair to say that the average student is graduated from the medical school with so little knowledge of practical obstetrics or so little understanding of the importance of this subject that his practice in this branch of his profession is open to legitimate criticism. Public-health officials, as well as obstetricians, have drawn attention to statistics that have been carefully gathered and that show without possibility of doubt that the proportion of cases of puerperal sepsis occurring in the practice of physicians is greater than that occurring in the practice of midwives. These studies or surveys have never given the midwife the benefit of the doubt. A common retort has been that all cases of puerperal sepsis inevitably find their way into the hands of some physician, but that the midwife was primarily responsible. In the studies that have been mentioned, this fact has been taken into consideration and all possibility of such criticism eliminated. If a midwife had been in attendance on the case at any time, or even if she had merely visited the patient, the case was counted against her record and considered as a midwife's case, even though the care of the patient was immediately intrusted to a physician.

The same relative balance is shown in studies made of the occurrence of ophthalmia neonatorum. The preponderance of cases of this disease rests with the midwives, in those communities where the latter are unsupervised and untrained, but in places where the training or supervision of midwives is required, studies have shown that in proportion to the number of babies delivered under their supervision, the physicians have more cases of this disease than do the midwives.

It is a common practice to indict the midwife for neglect of the mother at the time of confinement and for unskilled handling of the case, but only too often investigation has shown that a similar indictment may be drawn against the class of physicians who are too often careless and inadequate

and who have not maintained either the traditions or the technique of the best practice of their profession. There is undoubted need for improvement in the methods of teaching obstetrics in our medical schools. The serious condition that exists in the United States today with regard to excessive maternal mortality should stimulate the medical schools to pay immediate attention to the need of better obstetrical teaching. Until training for proper obstetrical practice as part of the curriculum of the medical colleges is placed on the right basis and given the relative attention it deserves, the medical profession as a whole must bear its part of the stigma that is attached to the neglect of proper care of women during childbirth. In recent years there has been a wholesome stimulation of public opinion with regard to the need for better obstetrics. In this movement the obstetricians are taking a leading part. In many communities the establishment of maternity centers and improved obstetrical facilities at hospitals have come about mainly as a result of efforts of that part of the medical profession, who specialize in obstetrics. Better teaching of obstetrics in the medical schools has been slower in its progress, but there are definite indications of improvement in this direction.

Midwives.—Until recent years, the midwife has had no legal status in the United States. Her presence has been accepted, but her existence has been ignored. Notwithstanding the knowledge that in some states midwives were in attendance at as high as 50 per cent to 75 per cent of the births, and notwithstanding the fact that it was well known that these women had practically no training, that they were dirty and unskilled, the situation was left to adjust itself. The "midwife problem" first began to attract attention about fifteen years ago. For many years it was a subject of debate. Health officers hesitated at attacking a situation which seemed to be immeasurably difficult. The medical profession was almost a unit in believing that the midwife had no

PROPORTION OF BIRTHS IN HOSPITALS IN CERTAIN CITIES[1]

City	Year	Per cent of births in hospitals
San Francisco, Calif.	1921	85.0
Minneapolis, Minn.	1921	62.1
St. Paul, Minn.	1921	60.4
Spokane, Wash.	1921	60.0
Hartford, Conn.	1921	53.0
District of Columbia	1921	52.9
Springfield, Mass.	1921	50.1
Syracuse, N. Y.	1921	48.3
Albany, N. Y.	1921	47.3
Oakland, Calif.	1921	45.8
Duluth, Minn.	1921	38.7
Cincinnati, Ohio	May, 1922	36.7
Salt Lake City	1921	36.7
Cambridge, Mass.	1921	36.3
Columbus, Ohio	May, 1922	33.6
Philadelphia, Pa.	1921	31.2
Bridgeport, Conn.	1921	30.9
Newark, N. J.	1921	30.6
Yonkers, N. Y.	1921	30.4
Pittsburgh, Pa.	1921	27.4
Cleveland, Ohio	1921	26.7
Grand Rapids, Mich.	1921	26.2
Buffalo, N. Y.	1921	26.1
Wilmington, Del.	1921	24.7
Scranton, Pa.	1921	24.0
Indianapolis, Ind.	1921	22.1
Toledo, Ohio	1921	21.9
Trenton, N. J.	1921	20.1
New Orleans, La.	1st 6 mos., 1922	19.0
Baltimore, Md.	1920	18.7
Louisville, Ky.	1921	18.1
Akron, Ohio	1921	18.0
Lowell, Mass.	1921	17.7
Fall River, Mass.	1921	16.1
Milwaukee, Wis.	1921	9.8
New Bedford, Mass.	1921	9.2

[1] Based upon reports of state or city bureaus of vital statistics.

place in our social fabric and the laity, or the public at large, was generally quite unconcerned.

The widespread use of the midwife in the United States has come about quite naturally as a result of our large foreign population. In Europe the midwife is generally recognized as having a distinct function. Practically every country in Europe maintains schools for the training of midwives, holds examinations for the purpose of determining the midwife's technical ability to practice, and main-

PROPORTION OF BIRTHS IN HOSPITALS IN CERTAIN STATES

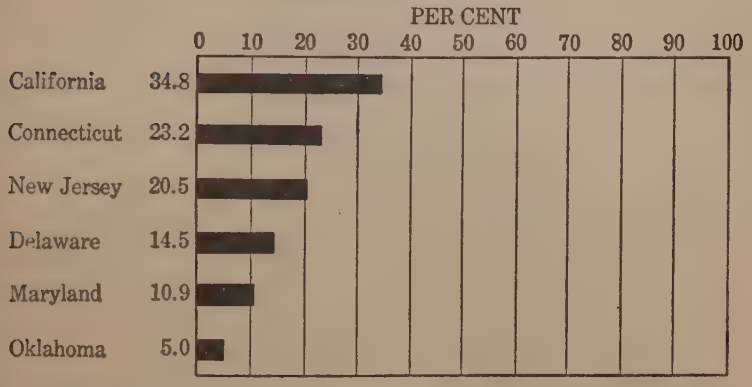


CHART III

Based upon Figures furnished the Children's Bureau, U. S. Department of Labor, by Courtesy of Health and Vital Statistics Officers in the Several States.

tains over midwives a continual supervision during their entire professional career. Owing to the unsettled conditions of many European countries at the present time, it is not possible to obtain exact information regarding all of the training schools for midwives, but in general it may be stated that their courses range from a period of six months, which is the case in England, to two years' training, required in The Netherlands. The majority of countries have courses ranging from one year to eighteen months. In Germany, France, and England the midwives are required to pay for

the cost of this training, the amount varying from sixty-five dollars to two hundred dollars for the period. The training schools are under strict supervision, the courses are standardized, and midwives are required to follow strict rules and regulations and to maintain a definite standard of

PROPORTION OF BIRTHS IN HOSPITALS IN CERTAIN CITIES[1]

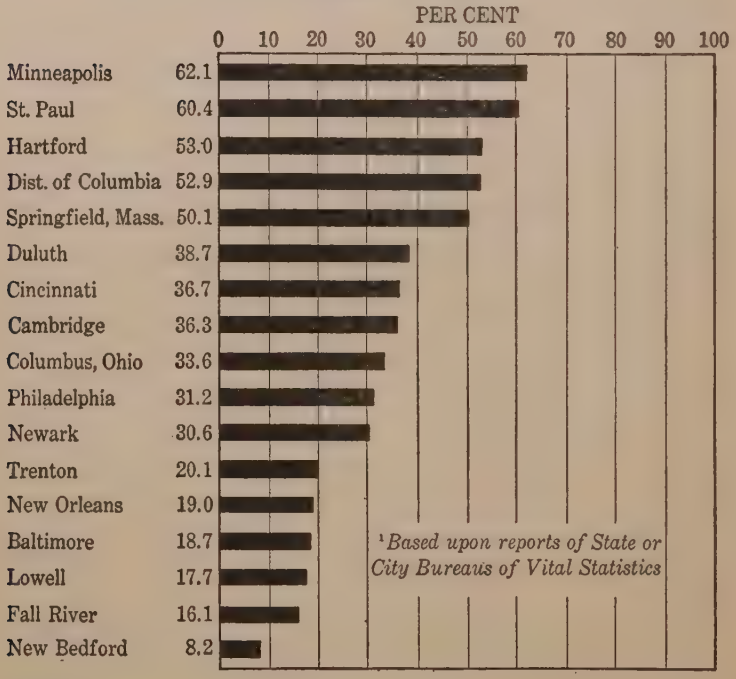


CHART II

Based upon Figures furnished the Children's Bureau, U. S. Department of Labor, by Courtesy of Health and Vital Statistics Officers in the Several States.

practice after they are practicing. Thus, in Europe, midwives have been accepted and are employed by the majority of women.

The women in our population who are of foreign birth or even of foreign parentage are used to the employment

of midwives. Whether we like it or not, the midwife occupies a useful place in our social structure. We may decree that she be abolished or eliminated, and we may even legally refuse her the right to practice, but we cannot prevent any woman from calling in a friendly neighbor to help her during her confinement, and this friendly neighbor soon becomes a midwife.

Supervised or unsupervised, trained or untrained, the midwife is employed. Not only do the women of our foreign population want her, and insist upon having her, but their husbands are equally insistent. Probably the reason why the United States has in the past been unable to cope with the midwife problem is because we have been engaged in discussing her technical equipment and the manner in which she carries on her work, and have neglected to comprehend the immensely important fact that the *demand* for the midwife is the controlling feature in the situation. In other words, the midwives as a whole will flourish unless the population they serve can be so educated that the initiative will come from them for the employment of physicians in place of midwives.

History of Midwifery.—It has been stated that the midwife represents the human side of obstetrics. Certainly, her history is as old as humanity itself. It is probable that some assistance has been required and has always been given at the time of child-birth. Moreover, the position of the midwife as given in history was an honorable and dignified one. Socrates' mother was a midwife, and to come down to even more modern times, a German midwife brought the future Queen Victoria into the world. It was not until some time in the seventeenth century that the function of midwifery was taken over as a part of the practice of medicine. Even then, its progress as a part of this profession was halting and insecure. Even the highest-born women hesitated to admit a man into their lying-in chamber, and until the last century the use of the midwife

by the middle and lower classes in Europe was practically universal.

Status of the Midwife in the United States.—The laws relating to midwifery vary greatly in the different states. In 14 states the midwife is examined and licensed by the state. In 35 states she is required to register locally. In 19 states there are definite laws and regulations governing her practice. In 47 states the midwife is required to report births. In the same number of states she is required to report all cases of ophthalmia neonatorum, and in nearly all of these she is required to use a prophylactic for the prevention of this disease. In only one state in the Union has the midwife no legal status whatever. That state is Massachusetts. In that state she was formerly barred from practice by the medical-practice law. That law was revised in 1920 and reference to the midwife was omitted. Therefore she now has no legal existence in Massachusetts. That she does exist and practice there is a well-known fact and Massachusetts, with curious inconsistency, ignores her existence, but demands that she report the births that she has attended and prosecutes her for failure to do so.

On the face of it, this situation with regard to the status of the midwife in the United States would seem to be fairly encouraging, but as a matter of practice the enforcing of these laws in many of the states is far from efficiently carried out. There are practically no educational standards. There is not a single state that under its own jurisdiction, maintains a school for midwives. There are, of course, some states that demand training, but an investigation has shown that in nearly all such instances they have been willing to accept diplomas from schools for midwives that were badly organized and utterly inefficient as to their faculty and courses of study, and maintained more for the purpose of gain than for any educational facilities that they might be supposed to offer. Only three states require a high-school education before a midwife is qualified to practice. Very few of the states require that an applicant shall be able to

PER CENT OF BIRTHS ATTENDED BY MIDWIVES, BY STATES

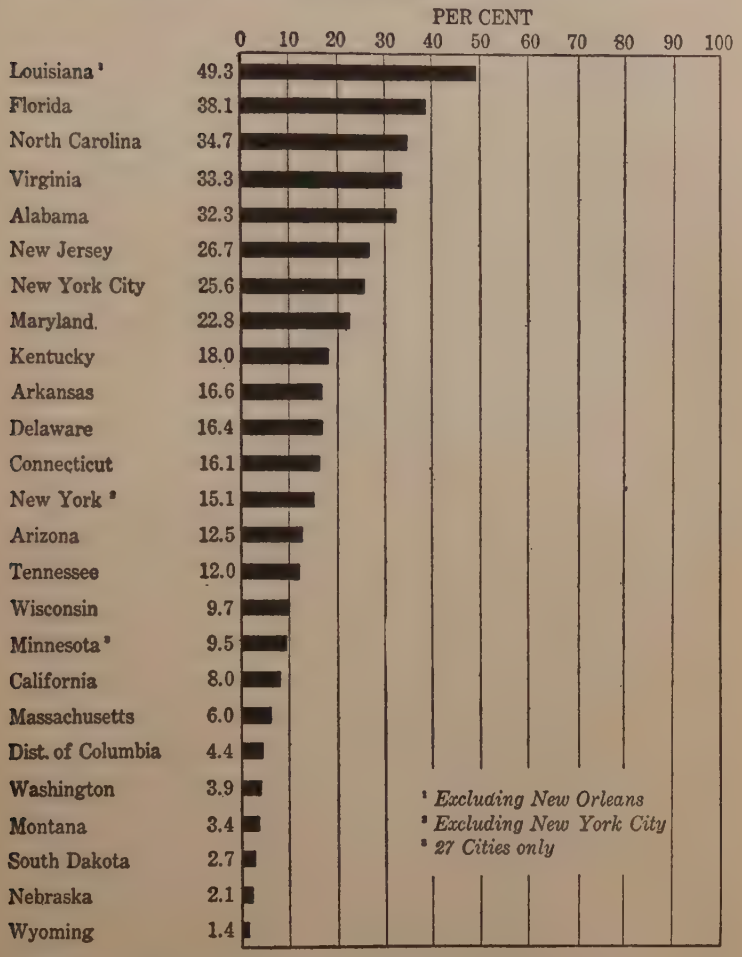


CHART I

Based upon Figures furnished the Children's Bureau, U. S. Department of Labor, by Courtesy of Health and Vital Statistics Officers in the Several States.

read or write in English, and some of these make no requirement that the midwife shall be able to read or write in any language. As there is no standardization of the education of the midwife, so equally there is no standardization of her equipment or the laws controlling her practice. The significance of the existence of midwifery legislation, however, lies not in the fact that it is ineffective and poorly administered, but rather in the recognition it implies as to the midwife's place in the community and the necessity for her recognition.

Certain cities in the United States have in this regard gone far in advance of the states in which they are situated. Probably the best known example of dealing with the midwife problem is that of New York City. In 1907 that city obtained a legislative enactment placing the control of the midwives in that city directly under the supervision of the Health Department and allowing that department to enact such rules and regulations as it saw fit to govern this practice. New York City's rules and regulations for the control of midwifery are modeled upon those of England. All midwives are required to register with the department, and, if their credentials are satisfactory, are given a license to practice. They are kept under constant and definite supervision, exercised by a special staff of doctors and nurses. Any intringement of the rules and regulations of their practice is considered a reason for a reprimand, and, in case of repetition, a revocation of their right to practice. New York City is still unique in that it is the only city in the United States that maintains a school for midwives under municipal control. This school, organized under the supervision of Bellevue Hospital in 1911, conducts an eight months' course of training. Students are required to live in the training school and, in addition to a thorough teaching in normal obstetrics and the training requisite for early diagnosis of abnormal obstetrical conditions, they are also required to do the nursing and household work in the training school, and to personally deliver, either in the school or in the

mothers' homes, a definite number of cases, ranging from twenty to sixty, before their diplomas are granted. Since the establishment of this school, the New York City Department of Health has required that no midwife may obtain a license to practice in that city unless she is a graduate of the Bellevue Training School for Midwives or holds a diploma from some other foreign or United States school of equal or higher standing. As no other school of equal standing exists in the United States, all of the midwives who have been licensed in New York City since 1911 are the well-trained graduates of the Bellevue School or the equally well trained graduates of the European schools, maintained under governmental control.

TABLE SHOWING DECREASE IN MIDWIVES IN NEW YORK CITY AND CASES CARED FOR BY THEM

	Midwives registered	Births attended	Percentage of total
1920..	1,517	36,369	26.6
1921..	1,546	34,325	25.6
1922..	1,539	30,061	23.2
1923..	1,341	27,466	21.3

While the preliminary training of midwives in other cities does not maintain the standard set by New York, there are a number of places where the supervision and control of the midwives already in practice is extremely commendable. Such are the cities of Philadelphia, Richmond (Virginia), Newark (New Jersey) and Cleveland (Ohio). Numerous other cities are beginning to exercise proper supervision over the midwife, but in few of these has the work progressed to a point where it can be viewed with any great degree of satisfaction.

To a large extent, the distribution of midwives in the United States seems to have come about as a result of the lack of physicians. That is, those states that have large

rural communities and inadequate medical service are the ones where the midwives flourish. This is true particularly in the South, in such states as Virginia and North Carolina, each of these states reporting over six thousands midwives in practice. In many of our Middle Western states the midwife has, in her branch of the profession, very largely supplanted the physician. Minnesota reports that over 75 per cent of its births are cared for by midwives. In the East, the midwives are mainly located in the large cities; in the Southwest they are to be found in greatest numbers in the rural communities. The control of their practice in cities is a comparatively easy matter. Similar control in rural districts is of extreme difficulty.

The fact that the midwife exists, and the further facts that she is still a social and economic necessity for a large part of our population, and that if she were to be eliminated there are not enough physicians in the United States to care for the number of confinements that occur, all lead to a serious consideration of the problem of the midwife as it relates to maternal mortality, the occurrence of still-births, and the mortality of infants during the early weeks of life.

Before outlining any methods of midwife supervision, we may well question ourselves as to what we may reasonably expect to accomplish by training the midwife and giving her a professional standing. As the blame for our high maternal mortality has very generally been laid at the midwife's door, it may readily be assumed that any reduction in the maternal death rate occurring in those localities which train and license their midwives might with equal justice be credited to this source. The best known illustration we have is the study made by William Travis Howard, Jr., of Johns Hopkins University, published in March, 1921, in the *American Journal of Hygiene* under the title "The Real Risk Rate of Death to Mothers from Causes Connected with Childbirth."

Doctor Howard, in his study, examined all statistics relating to maternal mortality in New York City, Philadelphia,

Baltimore, and Boston, (in the United States), and then selected two cities in Europe showing a low maternal mortality rate—Stockholm (Sweden) and Birmingham (England)—to be used as a comparison. The figures used by Doctor Howard covered the total maternal mortality and the maternal mortality due to puerperal septicæmia. He found that at that date "the average total rate from all diseases connected with the puerperal state for New York City (46.11 per 1,000 labors) was conspicuously lower than that of any of the other cities in the United States under consideration." While the total infant mortality rate for New York City was higher than that of the lowest European rate (Birmingham), Doctor Howard found that the mortality rate from puerperal septicæmia had not only fallen continuously throughout the five-year period that was studied, but it was, at the date of the study, distinctly lower than that of Birmingham, which had the lowest rate from this disease of the two European cities mentioned. Doctor Howard further states: "There is happily in the Department of Health of the City of New York evidence of a direct relation between the statistical studies in the Bureau of Records and the successful efforts toward the administrative control of puerperal fever, but in this respect New York stands in lonely isolation." This satisfactory reduction of the maternal mortality as a whole, and particularly from puerperal diseases, in New York City is placed by the Department of Health as due to the administrative measures which have been carried out for the better protection of women during the puerperal period and for raising the standard of obstetrics as practiced by midwives.

In an article published on this subject in the *Monthly Bulletin* of the Department of Health of New York City for May, 1921, it is stated:

> It can hardly be claimed that the general type of obstetrical practice by physicians and the conduct of the lying-in hospitals of New York City are on a higher plane than the planes of Baltimore, Philadelphia and Boston. While there is no question that an advance in obstet-

rical practice has been noticeable in the last decade, the fact still remains that New York is the only one of the cities of the United States mentioned in this report, which has instituted and maintained a vigorous and far-reaching control of the practice of midwives. The department believes that it is reasonable to infer that these administrative measures have been a prominent factor in the reduction of the death rate from puerperal diseases.

Supervision of Midwives.—The program for the supervision of midwives should include

1. *Registration of all Midwives in the Community.*—Where midwives have not previously been required to register, the methods of finding them and causing their registration must vary with the type of territory to be covered. Social service agencies, visiting nurses, physicians, hospitals, local health boards, and the public in general should be asked to report the name and address of any women practicing midwifery.

2. *Licensing of Midwives.*—When commencing an organized program for the supervision of midwives, it is wise to issue a license to every midwife registering unless there is legal evidence that she has been guilty of practicing medicine or that she has broken any laws. The purpose of this widespread granting of licenses at first is to bring all midwives under observation. Too strict requirements in the beginning will defeat their own purpose, for many midwives, fearing that they may not secure a license or that they may be reprimanded, will fail to register. If, however, all midwives, whether good or bad, are allowed to register, the first step has been taken in determining which ones should be allowed to retain their licenses and which should be barred from practicing.

It is interesting to note that in Louisiana, among the negroes, 82.2 per cent of the births are attended by midwives, as compared with 28.8 per cent among the whites. In North Carolina, 73.5 per cent among the negroes as compared with 17.8 per cent among the whites. In Maryland, 40.8 per cent among the negroes as compared with 17.9 per cent among the whites, while in the State of Washington,

PER CENT OF BIRTHS ATTENDED BY MIDWIVES, BY STATES

Louisiana, exclusive of New Orleans	49.3
Florida	38.4
North Carolina	34.7
Virginia	33.3
Alabama	32.3
New Jersey	26.7
New York City	25.6
Maryland	22.2
Kentucky	18.0
Arkansas	16.6
Delaware	16.4
Connecticut	16.1
New York (exclusive of New York City)	15.1
Arizona	12.5
Tennessee	12.0
Wisconsin	9.7
Minnesota (27 cities)	9.5
California	8.0
Massachusetts	6.0
District of Columbia	4.4
Washington	3.9
Montana	3.4
South Dakota	2.7
Nebraska	2.1
Wyoming	1.4

Based upon figures furnished the Children's Bureau of the United States Department of Labor by the courtesy of health and vital statistics officers in the several states.

"Administration of the Sheppard-Towner Act": by Grace Abbott.

66.0 per cent of the Japanese women, as compared with 10.3 per cent of the negroes and 0.8 per cent of the white women.

3. Training Preliminary to Granting a License to Practice Midwifery.—Extensive training of the midwives before giving them licenses should not be insisted upon too early as a part of the program for their proper supervision. Within a few years, however, plans should be made for the establishment of proper school for midwives, having at least

a six months' course, requiring the midwife to be in residence during that time and including adequate bedside, clinic, and theoretical teaching of normal obstetrics and the methods whereby abnormalities may be diagnosed. When such schools are definitely established, the community should require that all midwives who are not already licensed should take the training in these supervised schools before they are given a license to practice.

4. *Licenses to Midwives Should Be Granted Annually and Should Require Renewal Each Year.*—This brings the midwives under close supervision and control. . It also prevents losing track of any midwife who has moved her office.

5. *Supervision.*—If possible, a special staff of physicians or nurses or both should be provided to supervise the midwives, the character of their equipment, and their methods of practice. If a special staff cannot be maintained for this purpose, this type of supervision should be made the duty of the local or district nurse.

6. *Revocation of License of Any Midwife Who Fails to Follow the Rules and Regulations Concerning the Practice of Midwifery.*—For the first offense, the midwife should be warned, and after such warning a repeated offense should result in the revocation of her license.

Standard rules and regulations for the practice of midwifery have been issued by many state and city departments of health. These regulations cover every part of the midwife's work, and a copy of such regulations is given to each midwife who obtains a license.

Causes of Maternal Mortality.—While there can be no question that the causes already enumerated—that is, the present status of maternity training in all medical schools and the limited control of midwives—must be considered fundamental when discussing the basic causes of maternal mortality, we must still be concerned with the actual causes of death in order to determine the proportion of preventable and non-preventable fatalities. The accidents and diseases of childbirth fall into two classifications: (1) puerperal

septicæmia, including all septic infections, and (2) all other diseases, accidents, and complications caused by pregnancy and confinement.

The deaths due to accidents and diseases of childbirth in the birth registration area in the United States in 1918 were 12,496, or a rate of 88.48 per 10,000 births. Of these deaths, 9,023, or a rate of 63.89 per 10,000 births, were from all causes, with the exception of puerperal septicæmia. The deaths from puerperal septicæmia were 3,473, or a rate of 24.59 per 10,000 births.

Puerperal Septicæmia.—This type of infection at the time of childbirth is the cause of from 30 per cent to 50 per cent of all deaths which result from confinement. Its extent is an indictment of our obstetrical practice, as puerperal septicæmia may be prevented and should be entirely eliminated as the cause of death among women during childbirth.

Up to the first part of this century puerperal septicæmia was one of the greatest hospital scourges that has ever been known. At that time it did not occur to any great extent in private practice, and, indeed, at present, it is mainly found in lying-in hospitals and much less frequently when women are confined in their own homes. At the time of which we are speaking, the death rate from puerperal septicæmia among all women confined varied from 10 per cent to 20 per cent. In the event of an epidemic, the rate would be as high as 50 per cent or one-half of the women confined in the institution where the epidemic was raging.

Up to the middle of the last century we had no definite knowledge of the nature of puerperal septicæmia. It was commonly called childbed fever, and was held to be inevitable in a certain number of cases. In 1873 Oliver Wendell Holmes, and in 1877 Semmelweiss, published articles stating that puerperal infections, or those occurring at the time of childbirth, were of the same nature as any infection of wounds, and that the infectious material was carried chiefly by the hands of the doctor or other attendant. At that time it was not known that septic infection of the womb, or

DEATH RATES FROM PUERPERAL CAUSES PER 1,000 LIVE BIRTHS IN THE BIRTH-REGISTRATION AREA AND EACH REGISTRATION STATE: 1915 TO 1922

OTHER PUERPERAL CAUSES

	1922	1921	1920	1919	1918	1917	1916	1915
Birth-registration area	4.2	4.1	5.3	4.9	6.6	3.9	3.7	3.7
Birth-registration area as of 1915[1] (excluding Rhode Island)	4.0	3.9	5.1	4.5	6.6	3.7	3.7	3.7
REGISTRATION STATES								
California	4.6	3.9	5.1	5.5	[2]	[2]	[2]	[2]
Connecticut	3.7	3.1	4.6	4.2	6.0	3.0	2.8	3.7
Delaware	3.6	3.4	[2]	[2]	[2]	[2]	[2]	[2]
Illinois	3.9	[2]	[2]	[2]	[2]	[2]	[2]	[2]
Indiana	3.5	3.5	4.7	4.8	6.2	3.7	[2]	[2]
Kansas	4.3	3.6	5.0	5.1	7.1	4.2	[2]	[2]
Kentucky (total)	3.3	3.3	3.7	4.0	5.3	3.3	[2]	[2]
White	3.0	3.0	3.5	3.8	5.0	3.1		
Colored	9.1	7.7	6.0	6.4	10.1	5.2		
Maine	3.5	5.5	6.9	6.6	7.3	4.9	5.9	4.7
Maryland (total)	3.9	4.3	5.2	5.7	7.0	4.2	3.7	[2]
White	3.7	3.9	4.8	5.2	6.6	3.9	3.2	
Colored	4.8	5.9	6.8	7.5	8.9	5.3	5.5	
Massachusetts	4.6	4.3	5.1	5.0	7.1	3.8	3.5	4.1
Michigan	4.3	3.8	5.9	4.8	6.0	4.2	3.7	4.1
Minnesota	3.1	3.0	5.0	4.8	5.7	3.1	3.3	3.4
Mississippi (total)	5.6	6.4	[2]	[2]	[2]	[2]	[2]	[2]
White	4.6	4.9						
Colored	6.5	8.0						
Montana	4.1	[2]	[2]	[2]	[2]	[2]	[2]	[2]
Nebraska	3.5	3.9	4.7	[2]	[2]	[2]	[2]	[2]
New Hampshire	5.5	4.5	5.8	6.0	6.1	4.9	5.1	4.2
New Jersey	3.8	3.4	[2]	[2]	[2]	[2]	[2]	[2]
New York	3.8	3.8	4.6	4.1	5.9	3.4	3.2	3.3
North Carolina (total)	6.0	5.5	7.9	7.3	8.7	6.0	[2]	[2]
White	5.5	4.7	6.9	6.7	7.9	5.2		
Colored	7.2	7.2	10.1	8.9	10.6	7.8		
Ohio	4.2	3.8	4.5	4.5	6.5	3.6	[2]	[2]

DEATH RATES FROM PUERPERAL CAUSES PER 1,000 LIVE BIRTHS IN THE BIRTH-REGISTGATION AREA AND EACH REGISTRATION STATE: 1915 TO 1922

OTHER PUERPERAL CAUSES

	1922	1921	1920	1919	1918	1917	1916	1915
REGISTRATION STATES								
Oregon	5.5	4.5	6.1	6.0	[2]	[2]	[2]	[2]
Pennsylvania	3.8	3.9	5.0	4.2	7.7	3.7	4.0	3.7
Rhode Island	4.0	3.9	[3]	[3]	7.7	4.0	4.4	4.7
South Carolina (total)	7.6	7.2	9.4	8.0	[2]	[2]	[2]	[2]
White	6.8	6.0	7.1	6.0				
Colored	8.3	8.4	11.7	9.9				
Utah	4.0	4.3	5.9	6.2	6.5	3.7	[2]	[2]
Vermont	6.0	4.8	5.1	6.3	6.7	4.4	7.2	4.6
Virginia (total)	5.0	4.7	6.4	6.2	8.1	5.0	[2]	[2]
White	4.3	3.9	5.6	5.1	7.5	4.2		
Colored	6.5	6.4	8.0	8.6	9.4	7.0		
Washington	4.9	4.2	6.9	5.8	6.6	4.0	[2]	[2]
Wisconsin	3.7	3.6	4.6	3.2	4.1	3.6	[2]	[2]
Wyoming	5.0	[2]	[2]	[2]	[2]	[2]	[2]	[2]

[1] Includes District of Columbia.
[2] Not added to registration area until later date.
[3] Dropped from registration area.

puerperal septicæmia, was caused by any specific germ or bacterium. In 1863 Pasteur discovered that bacteria were the cause of all septic infections. In 1867 Lister, using the studies of Pasteur, came to the determination that wound infections at operations or infection during childbirth could be prevented by the destruction of the bacteria through disinfectants or antiseptics. Later, these methods of antisepsis, or destruction of the germs, were supplanted by methods of surgical cleanliness and asepsis, or prevention of germ growth.

About 1875 Listers' methods were applied to cases of childbirth. In 1879 Pasteur declared definitely that childbed fever was due to infection from bacteria. The application of this knowledge and its general use in hospitals and private

practice has reduced the mortality from puerperal septicæmia in hospitals to an average rate of one-fourh of 1 per cent, based upon all confinements. Generally speaking, in well-supervised hospitals to-day, only one patient dies from this disease where fifteen or twenty deaths occurred fifty years ago.

Our efforts for the reduction of maternal mortality must be centered to a great extent upon the prevention of puerperal septicæmia. There is no reason why any woman should die from infection at the time of childbirth.

Prevention of Puerperal Septicæmia.—The medical profession must assume the responsibility for the prevention of puerperal septicæmia. Improved courses in obstetrics for medical students, greater practical experience in conducting cases of childbirth before graduation from medical colleges, the more common practice of attending graduate courses, in obstetrics, the improvement of the equipment of lying-in hospitals, and the rigid training, licensing, and supervision of midwives are the methods whereby we hope to eliminate puerperal septicæmia as a cause of maternal deaths during confinement.

Other Accidents and Diseases of Pregnancy.—We may still further subdivide the causes of maternal deaths as follows: (a) accidents of pregnancy and (b) diseases of pregnancy.

Accidents of Pregnancy.—These are many and varied in their nature. The following abnormal conditions are usually considered as accidents of pregnancy: miscarriage, severe hemorrhage during pregnancy, uncontrollable vomiting during pregnancy, placenta prævia with severe hemorrhage, accidents resulting from operative delivery and rupture of the womb.

Prevention of Accidents of Pregnancy.—The prevention of these causes of maternal mortality belongs to the field of obstetrical practice. Public-health work for mothers and children may, to a certain extent, prevent or control these conditions and it is probable that prenatal super-

vision during the entire period of pregnancy would tend to reduce the death rate from these causes.

Diseases of Pregnancy.—Included in the diseases of pregnancy are what are known as puerperal albuminuria, or eclampsia, and milk leg. The former is due to acute poisoning occurring during pregnancy because of improper elimination of the waste products of the body from the kidneys and bowels, and is usually characterized by the occurrence of convulsions. Milk leg is caused by a blood clot in the large vein of the thigh or leg. These diseases rank next to puerperal septicæmia as a cause of maternal deaths. As far as albuminuria is concerned, the prevention consists in the early detection of the condition during the period of pregnancy, and therefore we may consider it in the same classification as the accidents we have spoken of as being possible of prevention by proper prenatal supervision and care.

Material Death Rates from Causes Connected with Childbirth in White and Colored Population.—In 1913 the death rate from all causes common to pregnancy and confinement was 15.2 per 100,000 white population, and 26.1 per 100,000 colored population. For the same year the death rate from puerperal septicæmia was 6.9 for the white population and 11.5 for the colored population. The significance of these figures lies in their relation to the distribution of the colored population of the United States and the consequent significance of the fact that those states which have the largest colored population have also the largest proportion of births cared for by ignorant, untrained midwives.

Public Health Prevention of Maternal Mortality.

Maternity Centers.—Maternity centers may be maintained solely for the purpose of prenatal instruction and care, with reference of the patient to a hospital or private physician for the time of confinement, or they may be connected with lying-in hospitals where the mother may be under continuous supervision during her prenatal period and confinement.

The first organization for prenatal care in this country

NUMBER OF DEATHS UNDER ONE MONTH FOR CERTAIN DISEASES, PER CENT OF TOTAL, AND DEATH RATE PER THOUSAND LIVE BIRTHS, NEW YORK CITY, 1920, AND EXPERIENCE OF MATERNITY CENTER ASSOCIATION, NEW YORK CITY, 1919–1921.

CAUSES	New York City, 1920			Maternity Center Association, New York City, 1919–1921		
	Number of deaths	Per cent of total	Death rate per 1,000 births	Number of deaths	Per cent of total	Death rate per 1,000 births
Total	4,651	100.0	35.0	207	100.0	25.9
Syphilis	63	1.4	.5	7	3.4	.9
Convulsions	14	.3	.1	6	2.9	.8
Pneumonia and Acute Bronchitis	352	7.6	2.7	18	8.7	2.3
Diarrhœa and Enteritis	201	4.3	1.5	1	.5	.1
Congenital malformations	471	10.1	3.5	13	6.3	1.6
Premature births	1,957	42.1	14.7	38	18.4	4.8
Congenital debility	667	14.3	5.0	55	26.6	6.9
Injuries at birth	627	13.5	4.7	32	15.5	4.0
All other and unknown causes	299	6.4	2.3	37	17.9	4.6

was founded in 1912 as the result of the efforts of Mrs. William Lowell Putnam of Boston, and conducted under the auspices of the Woman's Municipal League of that city. Probably the most extensive piece of work that has been done in the United States is that which is being carried on by the Maternity Center Association of New York City. This association was organized in 1918 to conduct in certain areas of the city the supervision of women during the prenatal period, to see that they are cared for during con-

finement and that the mother and baby receive care during the first month after the latter's birth. These organizations will be described later under the discussion of prenatal care in the chapter on Reduction of Infant Mortality.

Maternity Insurance.—Possibly the best study of maternity insurance has been made by Dr. Lee K. Frankel, vice-president of the Metropolitan Life Insurance Company, who is freely quoted in the following account of the history, extension and present status of this movement.

History.—The history of maternity insurance connects very closely with that which we have already discussed in government grants to mothers for the purpose of bringing up their children. In the thirteenth century there is a record of free hospital aid being given to women during confinement. This was in Pfullendorff, Germany. Throughout the fifteenth century there is evidence that the same country provided grants which were in the nature of maternity insurance. The first record in France of aid given to nursing mothers is recorded in 1317. In Italy a society for the benefit of pregnant women was organized in 1752. In 1796 the French court decreed that all mothers were entitled to hospital care and, in 1891, Paris founded the Mutualité Maternelle. This was the prototype of the modern maternity-insurance idea, and its members were required to make an annual contribution of three francs, and in return received a confinement benefit of forty-eight francs and a nursing benefit of ten francs. Provision for maternity care, including grants, have been made from time to time a feature in practically all European countries. The extension of the idea in the United States, however, has been slow, and at the present time there is no definite legislation pertaining to maternity insurance in any of our states. We have, however, certain types of legislation affecting motherhood. These are based mainly upon the gainful employment of women outside of the home.

Laws of this nature are being enforced in practically all European countries. The industrial code of Germany for-

bids women to work until four weeks after confinement, and permits it during the next two weeks only after an examination has been made and the woman found to be in good health. In Austria the law requires a rest period of four weeks after childbirth, and in Switzerland there is a rest period of two weeks before and six weeks after childbirth. France has enacted a compulsory rest period of eight weeks which are to be equally distributed before and after childbirth. In Italy, seven weeks of rest are required at this time. The Belgian and Portuguese laws require a rest of four weeks after childbirth, and Spain requires the same period, which may be extended by one or two weeks if a medical certificate is given, showing that such extension is necessary. Holland and Norway require a rest period of four weeks, while Sweden has a six weeks' rest period law. Great Britain prohibits the employment of women for four weeks after childbirth. Doctor Frankel calls attention to the fact that in the maternity-insurance legislation which has resulted from the effort to protect motherhood, the unmarried mother as a rule is given the same protection as the married mother.

In the United States, laws regulating rest periods before and after confinement have been placed on the statute books in Connecticut, Massachusetts, New York, and Vermont. In Connecticut a compulsory rest period of four weeks before and four weeks after childbirth is provided. In Massachusetts there is a compulsory rest period of six weeks, two weeks of which are before childbirth. The same provision exists in Vermont. New York does not require a rest period before childbirth, but the employment of women is forbidden for four weeks after that time. These laws in the United States are practically all a dead letter. There is no indication that any state has ever tried to enforce them, and it is likely that such action would be difficult or impossible, owing to the fact that no provision is made by any state for the payment of any sum of money to the mothers during this period of forced inactivity. When a mother is

faced by the question whether she is to obey the law and suffer deprivation because of lack of any income, or whether she will keep on working up to the time of her confinement and go to work again as soon after as may be, in order to provide for herself and her child, in the majority of cases there is little doubt as to which action the mother will take. If there is no economic pressure, the rest period before and after confinement is taken as a matter of habit. If the economic pressure exists, however—and the laws seem to have been made to reach just this class of women—the mothers will continue to work until some form of maternity benefit can be devised that will enable them to take the necessary rest period.

There is an indirect provision for the protection of motherhood in some states. As an instance, in Alabama, Colorado, Illinois, and Indiana, women are not allowed to engage in mine work. Nearly every state has a law limiting the hours of labor for women. Minimum-wage legislation has indirectly resulted in raising the standards of living, therefore affording greater protection to women in their capacity of future mothers.

The points upon which the arguments for maternity insurance are based are mainly those that have to do with the welfare of the mother during her pregnancy and period of confinement, and the health of both mother and child after birth. The studies that have been made are those which mainly relate to the results of industrial occupations on the health of the pregnant woman and on the health of the child. There is very little, if any, authentic evidence on record that the health of the mother is definitely injured because of her gainful employment during the pregnant period, and this is probably so because conditions of employment show such a wide variation. There can be no doubt whatever that the type of employment and not the employment itself is the main thing to be considered. During pregnancy it would seem obvious that women should not be employed in those trades or occupations which involve physical strain such as

lifting, standing, straining, or bending, nor should they work heavy machines which involve a physical effort. The dusty trades or those in which there is a great amount of vapor fumes or the filling of the air with lint or other irritating substances should be barred to the woman during her time of pregnancy. These types of occupation, together with long hours and low wages, must inevitably react upon the health of any woman, whether pregnant or not.

The effect of the employment of the mother upon the health of her child can be much more readily determined and will be discussed later in the section on infant mortality in its relation to the economic status of the family and the place of woman in industry.

Maternity Benefit Acts in Europe.—Possibly the most far-reaching maternity benefit law is that of Germany. Maternity insurance in that country has been compulsory under the law of 1911 for most of the members of industrial pursuits and also for home workers, with a limited annual income. A form of voluntary insurance is also provided for the wives of members who are given the benefit of this maternity insurance, which consists of a weekly payment for two weeks before and six weeks after confinement. During and since the war there have been changes in Germany's industrial code and a large part of the funds have been diverted to the care of soldiers. An attempt, however, has been made to protect the mothers and at the same time not place the burden upon the members who contributed the funds which make up the sickness and death grants, and the government is now bearing part of the cost.

Austria has a compulsory health insurance law for all workers and salaried employees. That law includes maternity provisions. The Danish law provides for voluntary maternity insurance, and this law, as does that of Belgium, gives grants to organizations to care for obstetrical cases, either in homes or in hospitals. Italy has a national maternity fund, including compulsory maternity insurance, for all industrial female workers of child-bearing age. This

fund is made up of contributions in equal amounts from the insured persons and their employers. In addition, there is a state subsidy of ten lire for each confinement. Switzerland's act of 1911 pays a federal subsidy to societies that are engaged in the provision of proper care of women during confinement. These societies have to pay a certain proportion of this insurance. The federal subsidy consists in the payment of twenty francs toward the confinement benefit and the payment of the entire cost of the nursing benefit. Sweden, under its act of 1912, requires maternity insurance to be provided by all voluntary societies maintaining any supervision of maternity, and adds to this a stated subsidy of fifty-eight ore a day benefit for a maximum period of forty-two days. Great Britain's law on this subject is that of the British National Insurance Act passed in 1911. This provides for sickness insurance, including maternity insurance, as compulsory for commercial clerks and industrial workers. It is voluntary for workers who have been exempted for special reasons. The annual income of the worker must be less than sixty pounds, except in the case of manual laborers. The cost of this insurance is divided among the insured, their employers, and the state. There is a maternity benefit of three pounds to insured mothers and of half that amount to mothers who are not themselves insured, but who are the wives of insured persons. The physician or midwife in attendance at the birth is paid out of the benefit.

In Australia the maternity benefit laws take an entirely different form. Here an outright gift of five pounds is made by the commonwealth to each mother upon the birth of a child. This grant covers all classes in the community and is not based upon the payment by the mothers of any sum whatever. It can hardly be classified as insurance, therefore, but must be considered as a straight government maternity benefit grant.

The need for maternity insurance in the United States would seem to be based upon (a) the number of women

in industry, (b) statistical evidence as to the danger of the employment of women up to the time and immediately after the time of confinement; (c) the extent of poverty, making financial aid necessary at the time of confinement.

MATERNAL MORTALITY[1]

	Women industrially occupied during pregnancy		Women not industrially employed during pregnancy	
	Number	Per cent of total number reported on	Number	Per cent of total number reported on
Had lost 25 per cent or more of their children	48	14.5	84	14.7
Had infants born, not healthy	41	16.2	55	16.29
Had bad confinements	28	10.55	52	11.06

[1] From the *Woman's Industrial News*, London, July 1918.

Data on the two latter points, as far as the mother is concerned, are difficult to obtain, and possibly do not exist. As far as the effect upon the child is concerned, however, and the effect upon the stillbirth rate, we have evidence that the protection of women during the pregnant period and the desirability of shielding them from physical and mental strain at that time will react immeasurably to the benefit of the child, both in the saving of life and in the promotion of health.

There is a wide difference of opinion as to the desirability of the state assuming any responsibility for maternity benefits. The employment of women in gainful occupations is not nearly as extensive in the United States as it is in Eu-

rope, but the tendency for women to be employed outside of the home is one that is rapidly growing, and shows signs of great extension in the past ten years. According to the census of 1910, out of the total population of women over ten years of age in the United States, 8,075,772 were employed outside of the home. The census of 1920 showed an increase of this number to 8,549,511. It is probable that this tendency will increase in the future. It will have its inevitable reaction upon the birth rate and the postponement of marriage. It is possible that it may not have a deleterious effect upon the health of women and the children born of such women. The economic status of women has improved to such an extent that their standard of living has shown similar improvement. The extension of education in public health, diffusion of knowledge concerning personal hygiene and the care of infants and young children, higher wages and better living conditions, must all inevitably react in the direction of a better physical condition of the race. On the other hand, the measures of danger that may come from the employment of women in those types of industry for which they are physically unfitted, or those types of industry which are in themselves pernicious and dangerous to health, may, because women are now more generally employed than formerly, show a definitely deleterious result on the health and vitality of the succeeding generation. It would be dangerous to predict the effect for good or for ill, of the extension of the employment of women outside of the home, both so far as their own health and that of their children is concerned. At the present time the need for maternity insurance in the United States has not been determined, and the arguments for it do not seem to be sufficiently conclusive to warrant legislation on that subject.

CHAPTER VI

THE BABY

Infant Mortality

"Does God fix the death rate? Once men were taught so, and death was recorded as an act of Divine Providence. We are now beginning to look upon infant mortality as evidence of human weakness, ignorance and stupidity. We believe that Providence works through human agencies and that in this field, as in others, we reap what we sow—no more and no less."—L. Emmett Holt, M.D.

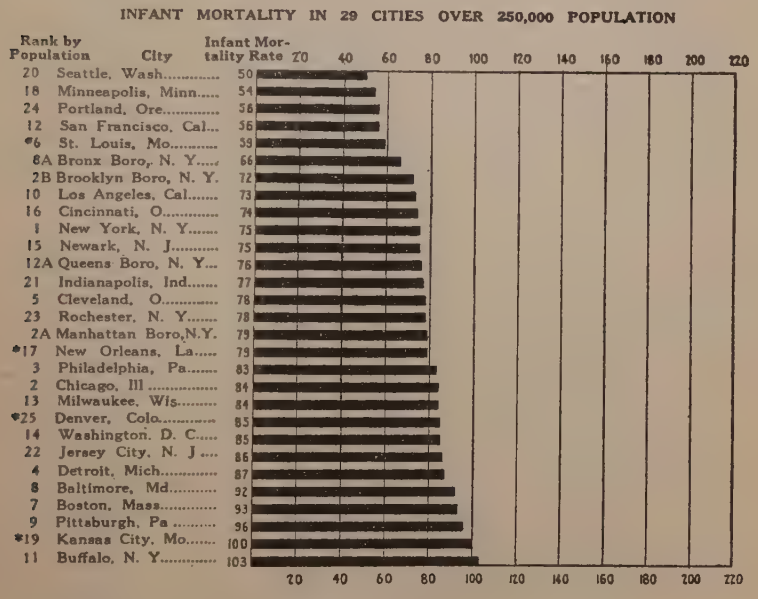
Definition: The infant mortality rate is the proportion which the deaths of infants under one year of age bears to each one thousand births occurring *in the same* area and during the same period of time. Other methods of computing infant mortality are based on (a) total population under one year of age; (b) the number of children born who live to pass their first birthday. These latter methods are both used, but the definition given above is the one that is accepted by practically all of the nations of the world, and it may therefore be considered as a standard.

It is evident that the infant mortality rate in the United States must be an estimate of the total infant mortality, as it is necessarily based upon the statistics in those states that are included in the birth registration area. This area contains 72.2 per cent of the population of the United States.

There are born alive each year in the United States approximately 2,620,000 babies. Of this number about 7.6 per cent or 199,200 die before they are a year old. Early infant mortality accounts for about 109,000, or over one half of these deaths. This early infant mortality is made up for the greater part of deaths from the following conditions:

malformations, prematurity, congenital debility, syphilis, and injuries at birth.

Comparative Infant Mortality in Cities and Rural Communities.—In 1921 the infant mortality rate in the cities in the birth-registration area was 78, and in rural communities 74. A further analysis of the infant mortality rates shows that the rate from certain causes is higher in the cities than in the rural communities, with the exception of


INFANT MORTALITY IN 29 CITIES OVER 250,000 POPULATION
Rank by Population
City
Infant Mortality Rate
20 Seattle, Wash. 50
18 Minneapolis, Minn. 54
24 Portland, Ore. 56
12 San Francisco, Cal. 56
*6 St. Louis, Mo. 59
8A Bronx Boro, N. Y. 66
2B Brooklyn Boro, N. Y. 72
10 Los Angeles, Cal. 73
16 Cincinnati, O. 74
1 New York, N. Y. 75
15 Newark, N. J. 75
12A Queens Boro, N. Y. 76
21 Indianapolis, Ind. 77
5 Cleveland, O. 78
23 Rochester, N. Y. 78
2A Manhattan Boro, N.Y. 79
*17 New Orleans, La. 79
3 Philadelphia, Pa. 83
2 Chicago, Ill 84
13 Milwaukee, Wis. 84
*25 Denver, Colo. 85
14 Washington, D. C. 85
22 Jersey City, N. J. 86
4 Detroit, Mich. 87
8 Baltimore, Md. 92
7 Boston, Mass. 93
9 Pittsburgh, Pa 96
*19 Kansas City, Mo. 100
11 Buffalo, N. Y. 103
20 40 60 80 100 120 140 160 180 200 220

* Indicates cities not in Birth-registration Area.

the following diseases, where the death rates are higher in rural communities than in cities: measles, whooping cough, influenza, dysentery, tetanus, convulsions, organic heart diseases, pneumonia, diseases of the stomach, congenital debility, and various external causes.

Infant Mortality in the Cities of the United States.—The latest official census figures of infant mortality in the cities of the United States cover the year 1921. The Bureau

of the Census, however, has published a summary of provisional birth and infant mortality figures for 1922 covering the cities in the birth-registration area. Charts showing the infant mortality rates and the relative standing in this regard are given, divided into three classes[1]: (1) infant mortality in 43 cities 100,000 to 250,000 population; (2) infant mortality in 68 cities 50,000 to 100,000 population, and (3) infant mortality in 29 cities over 250,000 population.

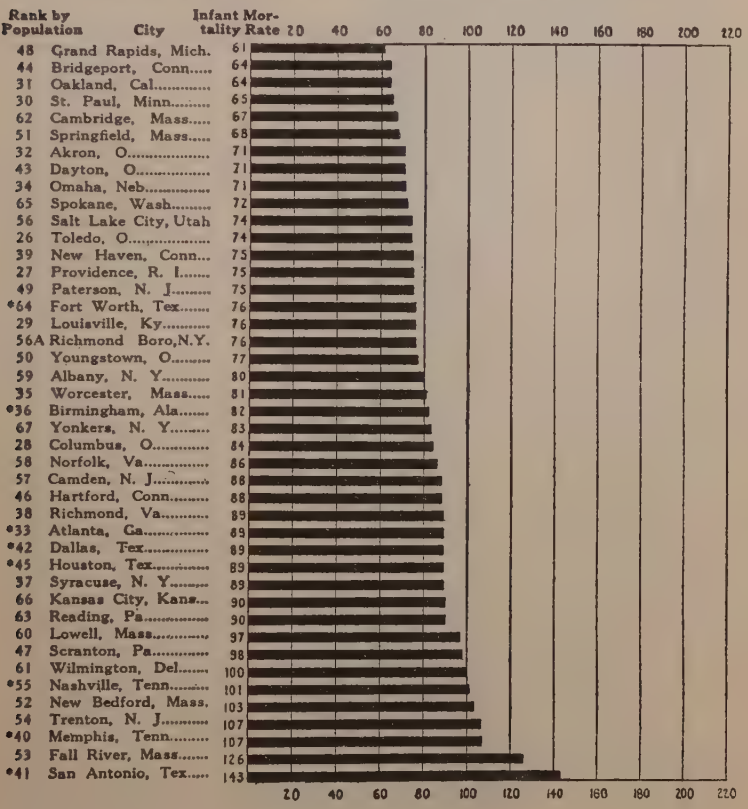
Infant Mortality in Cities in the Birth-Registration Area, 1922.—Statistics reported by the Bureau of the Census for the year 1922 show that in 29 cities having over 250,000 population the lowest infant death rate was recorded in Seattle, Washington—50—and the highest in Buffalo, New York —103. These cities have a rank, respectively, of 20 for Seattle and 11 for Buffalo, with regard to the relative population. There is every reason why a city like Seattle should have a low infant deeath rate, owing to its favorable location with regard to climate and its excellent social and environmental conditions, but there is no apparent reason why the city of Buffalo should have so high an infant death rate.

Of the infant mortality rates in the 68 cities of from 50,000 to 100,000 population, the lowest—37—is noted in Berkeley, California, while the highest rate—129—is noted in Charleston, South Carolina. Of all the cities studied, Berkeley ranks by population 121st in the list of cities of the United States, and shows the lowest infant mortality rate. In the list of infant mortality rates in the 43 states of 100,000 to 250,000 population, the lowest rate is that of 61 for Grand Rapids, Michigan, and the highest is 143 for San Antonio, Texas. This city ranks 41st by population among the cities of the United States and shows the highest infant mortality rate of all the cities from which rates were obtained. It is also significant that while the highest infant mortality rate in the cities containing over 250,000

[1] Graphs from "*Child Health*," published by The American Child Health Association.

population was 103 for the city of Buffalo, and only two cities of this group showed an infant death rate of 100 or over, the group of cities containing from 50,000 to 100,000 population shows 13 cities with infant death rates over

INFANT MORTALITY IN 43 CITIES 100,000 TO 250,000 POPULATION

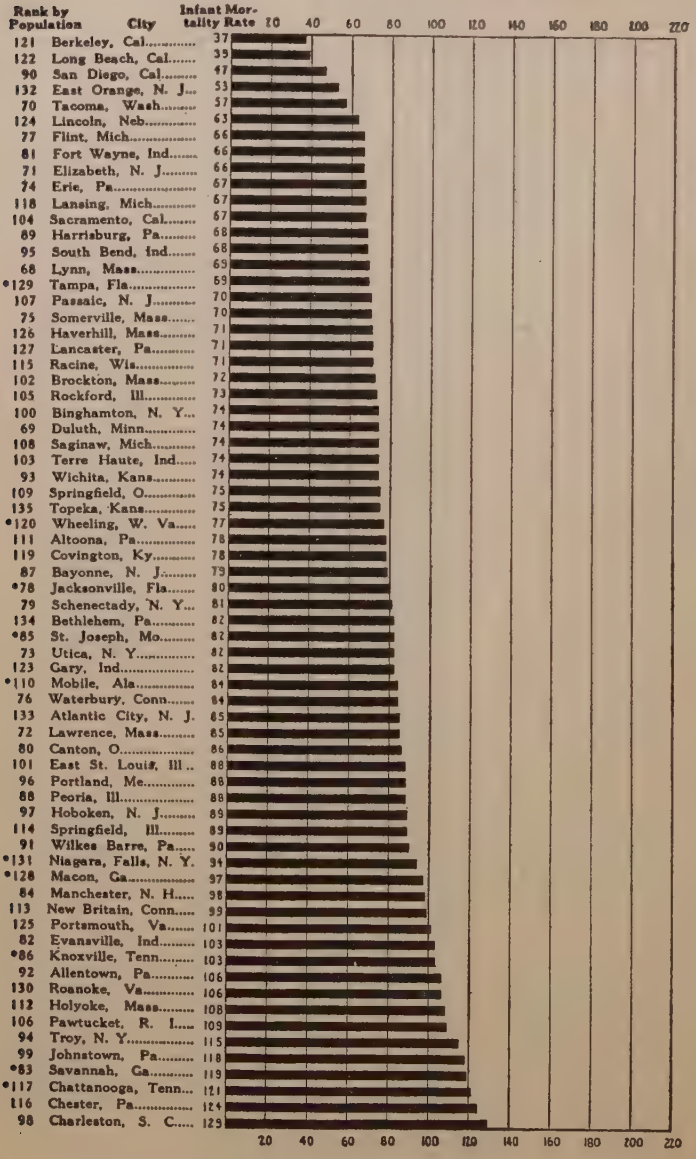

Rank by Population
City
Infant Mortality Rate
20 40 60 80 100 120 140 160 180 200 220
48 Grand Rapids, Mich. 61
44 Bridgeport, Conn..... 64
31 Oakland, Cal..... 64
30 St. Paul, Minn..... 65
62 Cambridge, Mass..... 67
51 Springfield, Mass..... 68
32 Akron, O..... 71
43 Dayton, O..... 71
34 Omaha, Neb..... 71
65 Spokane, Wash..... 72
56 Salt Lake City, Utah 74
26 Toledo, O..... 74
39 New Haven, Conn... 75
27 Providence, R. I..... 75
49 Paterson, N. J..... 75
*64 Fort Worth, Tex..... 76
29 Louisville, Ky..... 76
56A Richmond Boro, N.Y. 76
50 Youngstown, O..... 77
59 Albany, N. Y..... 80
35 Worcester, Mass..... 81
*36 Birmingham, Ala..... 82
67 Yonkers, N. Y..... 83
28 Columbus, O..... 84
58 Norfolk, Va..... 86
57 Camden, N. J..... 88
46 Hartford, Conn..... 88
38 Richmond, Va..... 89
*33 Atlanta, Ga..... 89
*42 Dallas, Tex..... 89
*45 Houston, Tex..... 89
37 Syracuse, N. Y..... 89
66 Kansas City, Kans... 90
63 Reading, Pa..... 90
60 Lowell, Mass..... 97
47 Scranton, Pa..... 98
61 Wilmington, Del..... 100
*55 Nashville, Tenn..... 101
52 New Bedford, Mass. 103
54 Trenton, N. J..... 107
*40 Memphis, Tenn..... 107
53 Fall River, Mass..... 126
*41 San Antonio, Tex..... 143

* Indicates cities not in Birth-registration Area.

100, and in the group containing from 100,000 to 250,000 population there were 7 cities showing infant death rates of 100 or above.

It is evident that our larger cities show, as a general rule, a much lower infant mortality rate than our smaller cities,

INFANT MORTALITY IN 68 CITIES 50,000 TO 100,000 POPULATION


Rank by Population
City
Infant Mortality Rate
121 Berkeley, Cal. 37
122 Long Beach, Cal. 39
90 San Diego, Cal. 47
132 East Orange, N. J. 53
70 Tacoma, Wash. 57
124 Lincoln, Neb. 63
77 Flint, Mich. 66
81 Fort Wayne, Ind. 66
71 Elizabeth, N. J. 66
74 Erie, Pa. 67
118 Lansing, Mich. 67
104 Sacramento, Cal. 67
89 Harrisburg, Pa. 68
95 South Bend, Ind. 68
68 Lynn, Mass. 69
•129 Tampa, Fla. 69
107 Passaic, N. J. 70
75 Somerville, Mass. 70
126 Haverhill, Mass. 71
127 Lancaster, Pa. 71
115 Racine, Wis. 71
102 Brockton, Mass. 72
105 Rockford, Ill. 73
100 Binghamton, N. Y. 74
69 Duluth, Minn. 74
108 Saginaw, Mich. 74
103 Terre Haute, Ind. 74
93 Wichita, Kans. 74
109 Springfield, O. 75
135 Topeka, Kans. 75
•120 Wheeling, W. Va. 77
111 Altoona, Pa. 78
119 Covington, Ky. 78
87 Bayonne, N. J. 79
•78 Jacksonville, Fla. 80
79 Schenectady, N. Y. 81
134 Bethlehem, Pa. 82
•85 St. Joseph, Mo. 82
73 Utica, N. Y. 82
123 Gary, Ind. 82
•110 Mobile, Ala. 84
76 Waterbury, Conn. 84
133 Atlantic City, N. J. 85
72 Lawrence, Mass. 85
80 Canton, O. 86
101 East St. Louis, Ill. 88
96 Portland, Me. 88
88 Peoria, Ill. 88
97 Hoboken, N. J. 89
114 Springfield, Ill. 89
91 Wilkes Barre, Pa. 90
•131 Niagara, Falls, N. Y. 94
•128 Macon, Ga. 97
84 Manchester, N. H. 98
113 New Britain, Conn. 99
125 Portsmouth, Va. 101
82 Evansville, Ind. 103
•86 Knoxville, Tenn. 103
92 Allentown, Pa. 106
130 Roanoke, Va. 106
112 Holyoke, Mass. 108
106 Pawtucket, R. I. 109
94 Troy, N. Y. 115
99 Johnstown, Pa. 118
•83 Savannah, Ga. 119
•117 Chattanooga, Tenn. 121
116 Chester, Pa. 124
98 Charleston, S. C. 129
20 40 60 80 100 120 140 160 180 200 220

• Indicates cities not in Birth-registration Area.

INFANT MORTALITY RATES FOR THE BIRTH-REGISTRATION AREA AND BIRTH-REGISTRATION STATES—1921

Registration area	76
California	66
Connecticut	73
Delaware	98
Indiana	71
Kansas	63
Kentucky	62
Maine	88
Maryland	94
Massachusetts	76
Michigan	79
Minnesota	59
Mississippi	68
Nebraska	59
New Hampshire	87
New Jersey	74
New York	75
North Carolina	75
Ohio	75
Oregon	51
Pennsylvania	88
Rhode Island	93
South Carolina	96
Utah	73
Vermont	78
Virginia	79
Washington	55
Wisconsin	72

although the rural rate, as a whole, falls below that of all cities as a group. The comparatively low rates in our large cities would seem to be indicative of the results that may reasonably be expected from comprehensive work carried on for the purpose of reducing the infant death rate. Practically every city over 250,000 population has a well-organized system for the promotion of infant hygiene and prevention of infant mortality. The causes of infant mortality are so many, so complex, and their relation to one another are so interwoven that it is not possible to definitely

compare in every instance the relation between the amount of child-hygiene work carried on and the present standing or the comparative reduction of the infant death rate in any community. In certain cities, however, the statistics relating to the infant death rate and the character of the work performed for the purpose of this reduction may reasonably be considered in relation to each other. This work and its effect upon the reduction of the baby death rate will be discussed later.

A study of the tables would seem to show that the low baby death rates recorded in the cities on the Pacific coast might well be due to the presence of the same conditions noted with regard to Seattle. We must also take into consideration in studying the death rates of these cities, the comparative absence of the racial groups that are found in the Eastern cities to so large an extent and to only a possibly less degree in the Middle Western cities. A study made by the New York City Federation of Churches states that "In New York City there are one million more foreign born than in the eight Western states of California, Nevada, Idaho, Montana, Wyoming, Utah, New Mexico, and Colorado. Moreover, all the foreign-born people of the seven large cities of Chicago, Philadelphia, Boston, Cleveland, Pittsburgh, St. Louis, and Baltimore are fewer than the foreign-born population of New York City. The speech of 68 races mingles in the streets of New York, and there are 165 papers printed there in foreign tongues." The conditions in these far Western cities may be easily comparable with the conditions existing in countries like New Zealand and Australia, and the infant mortality rates of the cities and states on or near the Pacific coast may readily be compared with the infant mortality rates of the two countries mentioned. The large cities in the East, however, should not be subjected to a comparison of their infant mortality rates with those of countries like New Zealand and Australia. The economic, social and racial conditions are entirely different and the problems connected with caring for a population

such as that in New York City have no similarity to whatever problems may be encountered in cities like Seattle, Washington, Portland (Oregon), and Los Angeles (California). And, indeed, it may be stated that the infant death rate of 66 in the Borough of The Bronx, New York City, and of 72 in the Borough of Brooklyn, New York City, are far lower in relation to the difficulties encountered in reducing the baby death rate than are those of 50 for Seattle and 56 for Portland and San Francisco.

In this connection it is interesting to recall a remark made to the writer by Sir George Newman, Chief Health Officer of England. When visiting one of the public schools in New York City, where the children in attendance were practically all of foreign birth, Sir George Newman stated in effect: "The health problems that must be met in the large cities of the eastern part of the United States cannot be compared with those met in any other large cities in the world. Ignorance may be just as extensive in the European cities as in New York, Chicago, Philadelphia, and Boston, and poverty may be just as extensive, but there is an important difference and one that adds greatly to the complexity of the public-health work. For the poor in London are English, in Rome they are Italian, in Berlin they are German, and in Paris they are French. In all of these cities we have a practically homogeneous native stock, but the poor among whom you find it most necessary to work in these cities of the United States are of every country in the world."

Infant Mortality Rates in the United States and Certain Foreign Countries.—According to the report of the Bureau of the Census for 1921 the infant mortality rates for the years 1916 to 1921, inclusive, for the United States and certain foreign countries are as follows:

The position of the United States in this list is a good one. For 1921 the only countries which show lower infant mortality rates are the Australian Commonwealth and New Zealand.

INFANT MORTALITY RATES IN THE UNITED STATES REGISTRATION AREA AND SOME FOREIGN COUNTRIES

	1921	1920	1919	1918	1917	1916
U. S. Registration area	75.6	85.8	86.6	100.9	93.8	101.0
Australian Commonwealth	65.7	69.1	69.2	58.6	55.9	70.3
Belgium	.....	.....	103.0[1]	133.8[1]	140.1[1]	116.3[1]
Ceylon	192.1	182.0	222.7	187.9	173.8	183.7
Chile	278.4	263.4	306.4	254.7	269.3	241.3
Denmark	77.2	90.7	91.6	74.2	99.6	99.9
England-Wales	82.8	79.9	89.1	97.2	96.5	91.2
Finland	.....	96.7	134.6	115.2	118.2	110.1
Germany	133.3	131.0	120.8	154.0	154.9	151.6
Ireland	.....	83.0	87.8	86.4	87.8	83.4
Jamaica	197.0	172.5	161.7	175.9	184.7	176.0
Japan	168.3	165.7	170.5	188.6	173.2	170.3
Netherlands	85.8	82.8	93.4	103.2	100.0	[2]
New Zealand	47.8	50.6	45.3	48.4	48.2	50.7
Norway	.....	.....	62.3	63.1	64.0	64.0
Scotland	90.3	92.0	101.6	99.8	107.5	97.1
Switzerland	.....	83.7	82.4	88.2	79.2	78.5
Uruguay	.....	117.3	100.5	110.1	106.9	123.9

[1] Deaths of infants alive when their births were registered per 1,000 infants alive when their births were registered.

[2] Prior to 1916 the only rates available are deaths under one year of age of infants "alive when their births were registered" per 1,000 infants "alive when their births were registered."

Infant Mortality Rates at Certain Ages From All Causes.—In determining the character of work that must be carried on in any community to effect any reduction in the baby death rate it is necessary to know the proportion of deaths occurring in certain age groups during the first year of life. Such figures may be computed in two ways: (1) using 100 deaths as a basis, and (2) using the total infant mortality rate as a basis. When the first system is used,—that is, with 100 deaths as a basis,—the relative proportion of the infant mortality rate in the United States birth-registration area for 1921 was as follows:

Under one day	18.5
" one week	37.8
" one month	52.5
" three months	66.0
" six months	81.2
" eight months	92.0
" one year	100.0

The second method, basing the infant mortality rates in these age groups under one year on the total infant mortality rate—75.6—for the United States birth-registration area, 1921, shows the following results:

Under one day	14.5
1 day	4.4
2 days	3.4
3–6 days	6.3
1 week	5.0
2 weeks	3.4
3 weeks	2.7
Under 1 month	39.7
1 month	6.3
2 months	4.9
3–5 months	10.9
6–8 months	7.8
9–11 months	6.0
Under 12 months	75.6

It makes comparatively little difference which system is used. In both of them we are aware of the strikingly high infant mortality during the first day, the first week or the first month of life. If we use one hundred deaths as a basis of computation we find that over one-half of the total mortality during the first year occurs during the first month, and that two-thirds of the total infant mortality of the first year occurs under three months. The importance of this lies in the information it gives as to the overwhelming preponderance of infant mortality in the earlier age groups. It is quite evident that efforts directed toward reducing the number of infant deaths must be concentrated upon the

early period of life if any considerable reduction is to be made in the baby death rate.

This leads to a consideration of the importance of prenatal care. Statistics for the United States as to the age at death under one year are not available for any period sufficiently remote so that comparison may be made of conditions at the present time with those that formerly prevailed. It is a matter of common knowledge that practically all of the work that has been carried on for the reduction of the infant death rate has been directed toward the occurrence of the diarrhœal diseases which formerly furnished the greater part of the infant mortality rate. A reduction in the baby death rate from this cause has been effected in every community where any comprehensive effort has been made for improvement of the milk supply, instruction of mothers in the care of babies, and constructive work carried on with reference to sanitation of the community and the hygiene of the family life. Such a reduction has not been shown in the death rate of babies under one month of age. Until our program for prenatal care and prevention of infant mortality from the so-called "congenital causes" occurring during the first month of life is comprehensive and carried out as part of the general program throughout the country, we shall probably not have any marked and continued decrease in our infant mortality rate.

Statistics relating to infant mortality in the United States are of interest and practical importance. These relate to (1) infant mortality rates based upon the country of the birth of the mother, and (2) infant mortality rates by sex.

The influence of race upon infant mortality is clearly shown in the figures just quoted. The lowest infant mortality rate shown, with two exceptions—Russia, 61.9 and Norway, Denmark and Sweden, 59.9—is that of children born of native mothers. This figure—68.4—compares favorably with the rate of 81.1, which is the death rate of babies born of mothers of all other nationalities.

INFANT MORTALITY RATES IN THE UNITED STATES, 1921, BY COUNTRY OF BIRTH OF THE MOTHER—BUREAU OF THE CENSUS

Total rate	75.6
Birthplace of mother:	
United States	68.4
Total foreign	81.1
Austria	93.6
Hungary	84.1
Canada	89.1
Norway, Sweden, Denmark	59.9
England, Scotland, Wales	69.7
Ireland	76.0
Germany	71.1
Italy	73.9
Poland	100.6
Russia	61.9
Other countries	96.3
Not stated	85.9
Negro	110.7
Other colored	78.8

The highest infant death rate is found among babies born of negro mothers—110.7; the next highest in babies born of Polish mothers—100.6. While these statistics are of great importance in determining conditions in the states as a whole, it is none the less true that in certain of our cities where immigration has been particularly heavy and where there is a large foreign population, the influence of the nationality of the mother upon the mortality of infants has been marked.

An important study has been made by Dr. William H. Guilfoy, Register of Records of the New York City Department of Health, which gives some interesting data on this subject. Doctor Guilfoy's study is based upon the different causes of deaths in infancy. It would seem evident that the effect of the mother's health, as shown in the vitality of the infant, would be most apparent in the earliest period of life. Therefore a study of the deaths from congenital dis-

eases, based upon the nationality of the mother, has a definite interest. For the year 1915, in the Borough of Manhattan, the infant death rate from congenital diseases, based upon each 1,000 births reported and classified according to the nativity of the mother, was distributed as follows:

United States	54.4
Ireland	57.0
Germany	57.7
Italy	29.5
Russia	32.0
England	47.4
Austria-Hungary	28.4
British America	8.1
Switzerland	65.2
France	59.1
Bohemia	51.1
Sweden	38.9

Further studies made by Doctor Guilfoy for the city of New York showed that out of every 1,000 babies born of Russian-Polish mothers over 920 survived the first year of life. Of 1,000 infants born of Italian mothers, 897, native mothers, 894, German mothers, 885, and Irish mothers, 881, were living at the end of their first year.

Analysis of the effect of the nationality of the mother upon the mortality of the children showed that the total infant death rate of babies born of Italian mothers was 58, the mortality of children of Irish mothers was 57, children of native mothers 38, children of Austro-Hungarian mothers 36. With regard to deaths from respiratory diseases in infants, he further states that "the death rate of babies of Italian mothers from respiratory diseases is more than three and one half times that of children of German mothers, almost three times that of children of Russian, Austro-Hungarian, and Irish mothers, and a little more than double that of American mothers."

The mortality from diarrhœal diseases in infants shows

also the effect of the race or nativity of the parents. The rates of deaths from these causes were as follows: English parents, 9.1; native parents, 8.0; Irish parents, 7.2; Italian parents, 7.0; Austro-Hungarian parents, 5.2; Russian parents, 3.0. It would seem, therefore, in New York City at least, that the effect of race upon infant mortality is a factor to be considered, for these figures show that the highest death rate from congenital diseases is among children of native born parents, the highest death rate from contagious diseases and from respiratory diseases is among children of Italian parents, while the highest death rate from diarrhœal diseases is among children of English and native parents.

Similar statistical data are furnished by P. R. Eastman, of the Division of Vital Statistics of the New York State Department of Health. Doctor Eastman's study covered the year 1916 and included the infant mortality statistics of New York State outside of New York City. He found that "the mortality of babies under one month old is higher among those born of native mothers than those born of mothers of foreign nativity. Although the death rate of babies of native women is only 87 per 1,000 births, compared with 108.4 for children of foreign-born mothers, the death rate under one month for the former was 47.4 as against 35.2 for the latter. Attention is also directed to the fact that the infant mortality of the children of native mothers over one month of age and less than one year old was only 39.6, contrasted with 63.2 for babies born to foreign mothers."

The significance of these two groups of figures as a practical aid in the formation of programs for effective child-hygiene work is evident. High congenital mortality among the children of native-born mothers gives an indication where the emphasis for prenatal work may be laid. High mortality rates for contagious and respiratory diseases among babies of Italian mothers gives similar indication in that direction.

Infant Mortality Rates in the United States and Certain Foreign Countries by Sex of the Baby

BIRTHS, DEATHS UNDER ONE YEAR OF AGE, AND INFANT MORTALITY RATES, BY SEX, FOR THE BIRTH-REGISTRATION AREA OF THE UNITED STATES AND FOR CERTAIN FOREIGN COUNTRIES

Country and year		Infant mortality rates. Deaths under one year per 1,000 births
U. S. Registration area, 1921	Males	83.5
	Females	67.3
Australian Commonwealth, 1921	Males	73.0
	Females	58.1
Austria, 1919	Males	169.3
	Females	142.6
Belgium, 1919	Total	103.0
Ceylon, 1921	Males	196.4
	Females	187.5
Chile, 1919	Males	313.9
	Females	298.6
Denmark, 1920	Males	100.1
	Females	80.9
England and Wales, 1920	Males	90.0
	Females	69.3
Finland, 1919	Males	144.9
	Females	123.5
Germany, 1919	Males	131.5
	Females	109.2
Ireland, 1920	Males	90.4
	Females	75.2
Jamaica, 1920	Males	178.4
	Females	166.4
Japan, 1919	Males	178.1
	Females	162.5
Netherlands, 1920	Males	82.2
	Females	62.9
New Zealand, 1920	Males	54.9
	Females	45.9

BIRTHS, DEATHS UNDER ONE YEAR OF AGE, AND INFANT MORTALITY RATES, BY SEX, FOR THE BIRTH-REGISTRATION AREA OF THE UNITED STATES AND FOR CERTAIN FOREIGN COUNTRIES

Country and year		Infant mortality rates. Deaths under one year per 1,000 births
Norway, 1918	Males	69.4
	Females	56.4
Scotland, 1920	Males	103.3
	Females	80.3
Switzerland, 1919	Males	91.8
	Females	72.6
United Kingdom, 1920	Males	91.6
	Females	71.1
Uruguay, 1920	Males	124.7
	Females	109.5

NOTE: The data for England and Wales, Ireland and Scotland, are taken from the annual reports of the registrar generals of these countries for 1920; and those for the other foreign countries from their annual reports on vital statistics. The data for the United Kingdom are obtained by combining the figures for England and Wales, Ireland and Scotland.

Much friendly rivalry has been manifested within recent years as to the comparative infant mortality statistics in the ten largest cities of the United States. In the ten-year period from 1914 to 1923, inclusive, New York City has had the lowest infant mortality rate of those of the ten largest cities in the United States that are included in the birth-registration area except for 1921 and 1922, when Los Angeles, California, showed a lower rate. New York regained its position at the head of the list, however, in 1923. A study of the relative positions of these cities during the years mentioned gives a fairly clear indication of the type and extent of work carried on for the saving of infant life

in the communities in question, as shown in the continued lowering of the infant death rate and in the rate itself. Such a comparison may be open to the criticism of not taking into account the many factors, both favorable and unfavorable, which might influence the infant mortality rate in any of the cities in question. Thus, climate, social and economic conditions, the preponderance of certain age groups, and the influence of race have not been considered. It may reasonably be believed, however, that in our large Eastern cities these factors may be counterbalanced and that conditions which obtain in any of them may readily be met in any of the others. For this reason, such comparison of the rates of cities in any one part of our country may be fair. A comparison between Eastern coast cities and those on the Western coast is open to many objections, but even with such comparison the record of the Eastern cities is not one for which they need apologize:

INFANT MORTALITY RATES IN THE TEN LARGEST CITIES OF THE UNITED STATES, 1914–1922

	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923
NEW YORK....	94.6	98.2	93.1	88.8	91.7	81.6	85.4	71.1	72.3	66.44
St. Louis.....	103.3	82.07	89.4	79.6	94.4	75.2	76.5	61.7	56.8	69.2
Boston.....	103.7	104.	103.7	99.06	114.8	96.8	100.8	77.1	92.7	83.27
Pittsburgh.....	115.2	110.	111.8	111.	122.5	115.3	110.1	93.6	94.3	95.3
Cleveland.....	116.4	110.7	107.	100.	97.4	90.8	86.	73.1	75.9	67.1
Philadelphia...	117.6	104.03	98.9	111.	123.9	89.9	88.57	77.8	82.1	78.63
Buffalo [2],.....	121.5	108.2	113.9	103.6	121.5	109.8	.....	.....	.....	.....
Detroit.....	122.4	104.6	112.8	103.4	100.7	96.8	104.2	83.6	87.	87.7
Chicago [1].....	132.7	114.	111.9	106.3	131.3	91.	85.48	89.6	85.5	87.3
Baltimore.....	154.6	141.1	118.9	119.2	147.7	97.	104.2	84.9	88.9	83.8
Los Angeles [3]..	.....	.....	.....	.....	.....	.....	70.8	66.1	65.7	70.17

[1] St. Louis not in the birth-registration area of U. S. Census; Chicago admitted in 1922.
[2] According to 1920 census, Buffalo is not now included in ten largest cities.
[3] According to 1920 census, Los Angeles is included in ten largest cities.

Infant Mortality in England and Wales and the City of London.—Possibly the most remarkable figures as to infant mortality rates of any foreign country are those of England, including Wales. These rates should be presented because they undoubtedly show the results of the splendid

efforts that have been made by that country to reduce its baby death rate. The figures covering the period 1911 to 1923, inclusive, are as follows:

INFANT MORTALITY—DEATHS UNDER ONE YEAR PER 1,000 BIRTHS

	1911	1912	1913	1919	1920	1921	1922	1923
England and Wales.	130	95	108	89	80	83	77	70
London.....	129	91	105	85	75	80	74	60

The 1923 figures are the lowest ever recorded. Since 1881, the infant mortality has fallen by half. It seems also that the birth rate for 1923 will be the lowest on record, though the figure is still tentative. The following table shows the almost continuous fall of recent years, the increase of 1920 being the only exception:

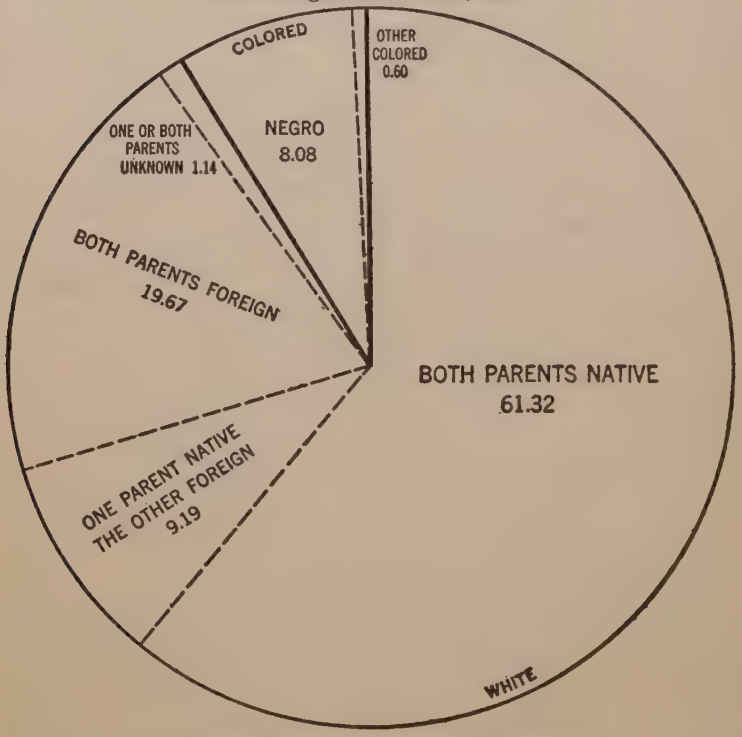
BIRTH RATES PER 1,000 POPULATION—ENGLAND AND WALES

1913	1914	1920	1921	1922	1923
24.1	23.8	25.5	22.4	20.4	20.2

The Decline in the Birth Rate.—The necessity for the reduction of the infant death rate is particularly great because of the decrease of the birth rate in practically all countries. Dr. Louis I. Dublin, statistician of the Metropolitan Life Insurance Company, in an article entitled "The Significance of the Declining Birth Rate," gives some interesting data on this subject. He states that in the beginning of the nineteenth century France had a larger population than either the United Kingdom or the states composing the German Empire. France's population at that time was 29,000,000. The states which composed the German Empire were second with a population of about 23,000,000,

and the United Kingdom stood third with a population of about 18,000,000. A century later the situation was entirely changed. The German Empire had a population of 65,000,000, the United Kingdom was second with a population of

Births, by Color, and for White Children by Parent Nativity, in the Registration Area, 1921[1]



[1]From Seventh Annual Report, Bureau of the Census, U. S. Department of Commerce.

45,000,000, and France was third with a population of only 39,000,000. In other words, as Doctor Dublin states, "While the population of the German Empire had nearly trebled and the United Kingdom had increased to two and a half times its earlier number, the population of France had increased less than one-half."

The decline in the population of France has been due to the discrepancy between birth and death rates in that country. In 1830 the birth rate was 30 to each 1,000 of the population; in 1914 it was 18 per 1,000. Even previous to the war the total death rate in France had begun to exceed the birth rate. Up to the time of the war the birth rates in the German Empire and United Kingdom continued high, being over 30 per 1,000 in 1895. During the war and since then the birth rates in these countries have declined.

Notwithstanding that France has this extremely low birth rate, the infant mortality rate of that country has been high and there has been an accompanying high stillbirth rate.

In England, during the five year period between 1871 and 1875 the birth rate was 35.5 per 1,000 of the population. In the period 1911 to 1914, inclusive, the birth rate was only 24 per 1,000. It is interesting, however, to note that in England there has been a very consistent decline in the total death rate. In 1870 the death rate was 22; in 1911 it was less than 14 per 1,000, and in 1923 it was 11.6.

In the United States the census of 1910 showed an increase of 16,000,000 lives over 1900, or an increase of 21 per cent. In 1870 the births of native white children were 67.8 per cent of the total white population in the United States, while in 1910 it had decreased to 65.5 per cent. In 1920 it was 67.3 per cent. The proportion of the births of infants of foreign parents has increased during this period of fifty years. In New England the proportion of the native white stock decreased from 52.3 per cent of the total white population in 1890 to 40.3 per cent in 1910. In the Middle Atlantic states the native white stock decreased from 51.8 per cent in 1890 to 44.8 per cent in 1910.

Owing to the lack of reliable birth statistics in this country it is difficult to compute accurately the changes that have taken place in the birth rate. Professor Willcox has made a study of this matter, based upon the number of children under five years of age per 1,000 women of child-bearing age—fifteen to forty-five years. He states that the propor-

tion of children to the number of child-bearing women has decreased about 50 per cent in the course of the last hundred years, and that at the beginning of the last century there were 976 children under five years of age for every 1,000 women between the ages of fifteen and forty-five years, whereas in 1910 the number was only 508 per 1,000 women at these ages. During the sixty years between 1850 and 1910 the number of children under five years of age per 1,000 women at the child-bearing ages decreased in the United States by 191, or at an average of 32 in each decade.

Doctor Dublin further states:

The decline in the birth rate in the United States has been, as elsewhere, selective in character. In Massachusetts, for example, where the best American data on birth rates are available, we find, first, that there has been a continuous decrease in the birth rate during the last forty years, and second, that this decrease has been most marked in the native stock. In 1910 the native stock had a birth rate of 14.9 per 1,000; the foreign-born birth rate was 49.1 per 1,000. In the same year the native death rate was 16.3 per 1,000 while the foreign death rate was only 15.4. There was thus an excess of deaths over births corresponding to a net annual loss of a little more than one-tenth of 1 per cent in the native stock, while there was an annual increase of 3.4 per cent among the foreign-born population.

A tabulation of a significant sample of the population returns for the 1910 census shows similar differences in the fecundity of women of native and foreign parentage. In a group of women under forty-five years of age, who were married for a period of from ten to twenty years, the average number of children was found to be 4.1 per married woman. The women of native parentage, however, showed an average of only 2.7 children, whereas the women of foreign parentage showed an average of 4.4 per married woman. In like manner it was found that 7.4 per cent of the women under forty-five years, who had been married ten to twenty years, had borne no children. The women of native parentage had borne no children in 13 per cent of the cases whereas the women of foreign parentage had borne no children in only 5.7 percent of the cases. In view of the fact that very few children are born to women who have been unproductive for a period of at least ten years, we may consider these figures as fairly reliable indices of sterility in the two groups. We find that close to 40 per cent of the married women of native parentage had borne only one or two children, whereas the women of foreign parentage showed only

19 per cent of their number in this group. Finally, only about 10 per cent of the women of native parentage had five children or more, whereas 33 per cent of the women of foreign parentage belong in this group.

Additional evidence of the selective character of the declining birth rate is presented in special studies of the size of families of college graduates and of men of science. Thus Phillips, in his work on the birth rate among graduates of Harvard and Yale universities, shows that the number of children born per married graduate has fallen from about 3.25, in the decade 1850 to 1860, to a little over 2, in the decade 1881 to 1890. Similar facts are observed in the statistics for other college graduates, but none are so low as those for the graduates of colleges for women. Thus we find that the number of children per married woman graduate of Smith College was only 1.3, of Vassar 1.6, of Bryn Mawr 1.7, and of Holyoke 1.8. Even more significant is the ratio of children per graduate, which for all of these colleges is less than one, due to the fact that less than 50 per cent of the graduates of women's colleges marry. Professor Cattell further shows in his study of 643 American men of science that the families from which the scientific men had come had an average of 4.7 children, while these scientific men who were married and whose families were complete had an average of only 2.3 children, these figures including all the children born.

The death rate of babies in the United States can no longer be considered an indictment of our civilization, but it is still high enough so that we cannot view it with any satisfaction or have the idea that we have exhausted our final efforts in its reduction. The excessive waste of infant life that was so common even twenty years ago, and was little short of slaughter one hundred or even fifty years ago, has disappeared and there is no reason to believe that such conditions will ever reappear, but we are still far from our ideal. We have every reason to feel confident that the present baby death rate can be reduced at least one-half, and possibly two-thirds, within the present generation. Indeed, with a well-planned program, there is no reason why the baby death rate of the future should not cease to be a problem at all. We may well look forward to the time when the irreducible minimum will be reached and babies will at last

attain their birthright of mental and physical vigor and health.

There is no other field of public-health work where we can be more confident of our results. Saving babies is an easy task, and, moreover, it is such a human one that it holds an appeal for everyone. It is a fact well known to every health official that it is easier to obtain the necessary appropriations for baby-saving work than it is to obtain the money for any other type of public-health activity. Once the need is clearly expressed, the support is assured.

Some years ago a "baby-saving show" was held in Philadelphia. Mr. Homer Folks was one of the speakers, and put the matter pungently when he said, "If this had been an 'infant mortality exhibit' I would not have come here to speak to you. I know of few people who are interested in what seems to them to be the abstract proposition of infant mortality, but I do not know of a man or woman who would not, if need arose, take off his or her coat and go out and 'save a baby.' "

When we speak of infant mortality, therefore, we are not referring to some vague part of the public-health program. We are dealing with humanity at its most helpless period, and the call to our sympathies and our emotions is an insistent one and not to be denied. One has only to think of the suffering and the loss that come to each family when the baby dies, to realize that there is no form of human endeavor so worth while as the prevention of these needless deaths and the assurance of sound health to every child.

With our present knowledge of the methods whereby we may keep babies alive and well, there is no excuse for any community having a baby death rate above 50. Within a few years we will be able to say that no baby death rate should be above 25, and he would be a brave person, and one not conversant with the possibilties, who would dare gainsay the prediction that even a baby death rate of 25 will be looked upon, within the near future, as an evidence that we are guilty of negligence.

CHAPTER VII

THE BABY

The Causes of Infant Mortality

It is a common attitude of mind to consider the basic cause of infant mortality as poverty and ignorance. In a certain sense this is true, but we cannot dismiss the matter in so easy a fashion. Both poverty and ignorance may be the result of many complex factors, and until we take these factors into consideration the terms "poverty" and "ignorance" have little meaning. The mere fact of being poor does not cause sickness or death in babies, but the by-products of poverty, such as forcing women out of their homes into industry, with consequent neglect of their babies, or the maintenance of a standard of living that falls below the minimum required for the conditions of decency upon which health depends, may be reflected in the infant death rate.

Ignorance is not necessarily associated with poverty. It may be found in homes of families where the income is sufficient to maintain a proper standard of living, but where advantage is not taken of this possibility. Intelligence and poverty may result in a low baby death rate; ignorance, coupled with the advantages of a considerable income, may result in a high baby death rate. The causes affecting the well-being or lives of babies or children cannot, therefore, be dismissed so casually. We shall have occasion later to discuss both of these factors more in detail, but for the purpose of making an analysis of both the basic and ultimate causes of sickness and death in infancy the subject may be approached from several other points of view.

While ignorance, and the necessity for proper education of mothers in the care of their babies, occupies a large place from the viewpoint of the causation of infant mortality and its prevention, the classification of causative factors that is most generally accepted includes the following: (1) economic, (2) social, (3) sanitary and hygienic, (4) terminal or medical cases. A further classification into the two main groups of (1) environmental and (2) individual causes is more difficult to make, but it has value because in a broad sense the baby's health is affected for good or ill by both his environment and the individual care he receives.

The environmental conditions affecting child life and health are the same as those that affect life at all ages. The fact is well known that an individual is sensitive to his surroundings in inverse proportion to his age. The time when the baby is most actively affected by his environment is during the prenatal period, when his environment consists entirely of the conditions that relate to his mother's health and well-being. In other words, during this period, the baby's environment is his mother.

After birth, the infant is only slightly less sensitive to the conditions that surround him. Matters relating to community sanitation, decent housing, the hygiene of the home, and the routine of the family life affect the infant when the same conditions will show little or no appreciable effect upon the adult. In this sense, the causes of infant mortality may be sought in unclean streets, lack of recreation facilities, bad housing conditions, insufficient amount of proper ventilation or sunshine in the home, lack of facilities for proper disposal of garbage and other refuse, uncleanliness, overcrowding, a contaminated water supply, or a standard of living below the minimum of safety.

The individual conditions that affect infant mortality are closely related to the community or environmental conditions that have been mentioned. It is difficult to make any sharp line of demarcation between the two. Even the most unfavorable environmental conditions may be adjusted or their

ill effects obviated by intelligent care of the individual baby. The question of pure milk supply is partly environmental and partly individual. We may assume without argument that if the baby is to be bottle-fed a supply of pure milk for infant feeding is an absolute essential. On the other hand, it is equally essential that the mother should know how to modify this milk in a proper way and how to care for it in the home if it is to remain safe for purposes of infant feeding. If the supply of milk is of doubtful quality or safety, the possible ill effects may be obviated by pasteurizing or boiling the milk and giving it proper attention in the home. Without this added care, the effects of its use may be disastrous in the extreme. In the same way the facilities for proper recreation, decent housing, and the other environmental conditions may seem to be lacking, but even if they are provided they will have little effect upon the health of the infant if the mother does not use them. It may be possible to have the home well ventilated, but the family may not take advantage of this possibility. Parks and playgrounds may be available, but if unused they might as well be non-existent. The enormous importance of intelligent motherhood may find its most striking manifestation in its ability to readjust apparently harmful conditions into those which make for safety for the baby, the older children, and the family as a whole.

There can be no question that there needs to be more extended study and effort directed toward the amelioration or entire readjustment of the social and economic factors which affect the health of the people as a whole. This is essentially a long and slow process, and in the meantime it has been found that such conditions need not necessarily continue to be a cause of infant mortality in individual instances.

Economic Causes of Infant Mortality.—The Federal Children's Bureau has published a large number of studies of infant mortality in various cities, selected because of some striking characteristic, such as congested population, the extent of the employment of women, the type or variety

of race groups or the character of the population. In each one of these cities the relation of economic conditions to infant mortality is strikingly illustrated. In her annual report for 1923 Miss Grace Abbott, chief of the Children's Bureau, states that a stury made of the causes contributing to the occurrence of infant mortality in this country, as revealed in intensive field work reports made by the Bureau in eight American cities, shows a direct relation between the rate of the family income and the infant mortality rate. Miss Abbott states:

A classification according to father's earnings shows that the lower the father's earnings the higher is the infant mortality rate. The mortality rate of infants whose fathers earned less than $450 a year was nearly three times as high as that which prevailed in families in which the fathers earned $1,250 and over. This relationship between low income and infant mortality is shown to be largely the result of the association of low earnings with economic pressure as measured by the average amounts available for food, clothing, and other necessities for each member of the family.

The influence of economic pressure upon infant mortality is shown to be independent of race or nationality, since the same close relationship between the father's earnings and the infant mortality rate is found in each race and nationality group; and the analysis indicates that it is not due to any greater prevalence of artificial feeding in the low-income groups, since, in fact, the infants in these groups receive relatively more breast feeding than those in groups more favorably situated as to income.

An interesting point brought out in the study is that if mothers, through gainful employment, add to family earnings, the infant mortality rate was not reduced, but raised; the disadvantages associated with the mother's employment more than offset the advantage derived from the income available from her earnings. The rules of health during pregnancy prescribed by physicians—rest and freedom from worry and overwork—are difficult of observance for the mother who must struggle to make ends meet and who often has to supplement the father's earnings by her own work. The mother's employment often entails artificial feeding for the infant. If artificial feeding is resorted to because of the mother's employment, her ill health, or some other reason, the infants in the poorer families are likely to be further handicapped, since with low incomes less money is available for the purchase of milk of good quality and for observing the rules for milk modification and for proper handling of milk.

The influence which the father's earnings exert upon infant mortality is thus augmented by the connection between low earnings and the mother's employment, as it is by that between low earnings and poor housing. So far as low income is responsible for the prevalence of employment of mothers, and for poor housing—conditions which themselves influence infant mortality—the adverse influence of these factors should be charged to it as the underlying cause.

Statistics are also given in the various reports of the Children's Bureau as to the relation between the wages of the father and infant mortality. The Johnstown report states that where the father earned less than $521 per year the infant death rate was 155.7, and where the father earned more than $1,200 per year the infant death rate was 84. A study made in seven other cities gives the following data upon this subject:

Father's Earnings	Infant Mortality Rate[1]
Under $450	116.9
$450 to $549	125.6
550 " 649	116.6
650 " 849	107.5
850 " 1,049	82.8
1,050 " 1,249	64.0
1,250 and over	59.1

[1] Based on Children's Bureau studies in seven cities.

The figures given in these studies as to earning capacity relate mainly to the time before or during the World War. It may be said that all wages have increased at the present time and that such figures cannot be taken as affording a basis for any consideration of the relation of specific wages to infant mortality at the present time. But while it is true that wages have increased, it must be remembered that the cost of living has shown a greater increase than that included in the rate of wages to-day. Professor William F. Ogburn estimated that the minimum living standard represented in 1914 in New York by the outlay of between $800 and $900 a year could not be maintained in that city in December,

1918, for less than $1,500 per year. Unless, therefore, the wages that have been given have been more than doubled, the increased cost of rents, food, and clothing would necessarily make the relation between income and outgo a more definite problem to-day than it was when these figures were assembled.

The question of income in its relation to infant mortality is not, however, as simple as it appears. A lessened income necessarily affects a large number of those factors which may be shown to have a definite relation to the infant death rate. The amount of money that may be spent for rent, which involves the question of housing and decent living conditions, the location of the home, the provisions for recreation, the question of overcrowding, and the gainful employment of the mother, are all dependent upon the balance between income and the minimum decent standards of living conditions.

From this point of view it is possible to see that poverty is a cause of infant mortality, yet it can be considered so only on a relative basis. It is not so much a question of the family earnings as it is the relation between their expenditures and their earnings, and moreover, it involves the degree of intelligence that is used in these expenditures. High incomes do not necessarily mean that the money is expended wisely or that the children in the family receive the benefit of the larger family income. There are large numbers of rural districts and small towns where it is possible to bring up children in a safe, clean, and hygienic way on a family income that would be below the poverty line in many of our cities. Therefore, in considering the relation of actual income to the baby death rate we must constantly keep in mind the by-products of the low income and consider whether or not poverty alone can be blamed as the cause of a high infant death rate, or whether the other conditions which may or may not depend upon extreme poverty may not themselves be the responsible factors. Women may work outside of the home for reasons other than poverty.

There may be overcrowding in the family because of the desire to spend the savings effected for expensive clothing or even the purchase of an automobile. Unhygienic or dirty living conditions are as frequently the result of lack of intelligence or slovenliness as they are of the lack of money. A standard story that has survived the test of time is that of the family who habitually used the bathtub as a coal bin. Necessity and habits may well be an index of the general manner of living of the family in question, but the possession of both the bathtub and the necessary coal to fill it can hardly be considered as evidence of extreme penury. It is possible that in considering the relation of income to infant mortality we have been somewhat misled by our neglect of full consideration of that important factor, the standard of living. Only when we make a more detailed study of those factors in life which make up a minmum standard which must be maintained for health and decency can we evaluate correctly the extent of the economic causes of the baby death rate.

Sanitary and Social Hygienic Causes of Infant Mortality.—It is impossible to separate these causes. They include all that have to do with the immediate living conditions, standard of living and general decency and well-being of the family. Heredity, care during infancy and child life, housing, the character of the food and milk supply, decent sewage disposal, the question of the number of people living in a certain number of rooms, and the general hygiene of the household all must be considered.

In a certain sense, the difference in the infant mortality rates in cities and in rural communities may be considered as due to social forces. If, however, these were the only things to be considered, the difference in the rate between cities and rural communities would be far greater than it is. The other factors as to living conditions and all that they imply must be taken into account. Health and social workers are perfectly familiar with the insanitary and unhygienic conditions that may exist in small towns or rural communities.

There are thousands of babies and children in the United States who are born in country homes and who, if they survive, live in surroundings that are wholly unfit for human habitation. There are few cities that would tolerate in their tenements the filthy conditions that are often found in homes in rural communities. We cannot make a general indictment in this regard, but as the country has the great advantage of an abundance of pure air and sunshine, and as there is no excuse for overcrowding where rents are low and land is cheap, we must necessarily realize that the efforts to counteract the evil effects of tenement life in our large cities have been successful, and the low infant death rate in many of our cities as contrasted with the high infant death rate in many of our rural communities is an evidence of this. This change in the relative status of cities and rural communities in regard to infant mortality becomes more striking when we recall the statement Doctor Farr made in the latter part of the last century, that "in a rural district the infant mortality under one month was 145 per 1,000. In England as a whole, 571 per 1,000, and in an urban community such as Liverpool 672 per 1,000." England's present experience in the changing relation of the baby death rate in cities and rural communities follows closely that of the United States. Early figures for this country are not available, but the figures given out by the Census Bureau for 1921 show that the infant mortality rate was 78 in the cities in the birth-registration area and 74 for the rural districts in the same area.

It is difficult, after consideration of the above facts, to draw any general indictment against the cities as places of residence for infants. In fact, since work for the prevention of infant mortality has been carried on to any extent in our cities, their death rates are frequently much below similar rates in small towns and rural communities where no baby-saving work has been put into effect.

A personal experience which occurred eight or nine years ago is an illustration of this point. A small city on the

Hudson River, containing about 15,000 inhabitants, little poverty, and excellent social and economic conditions, was hesitant about establishing a baby health station, claiming that there was no need for one. The State Department of Health urged the town to make an effort to reduce their infant motality rate. Little enthusiasm was aroused, but finally a mass meeting was held to discuss the proposition. In introducing the speaker, who was from New York City, the Mayor said that he had been forced to change his mind as to the desirability of having a baby health station in the town. He confessed that he had given the matter of the infant mortality rate very little, if any, attention; that he had known for years the town had been in the habit of raising a fund each spring so that New York City babies might be brought to this town and have the needed vacation and country life that might save their lives. The appeal was to get the babies out of the hot and crowded tenements of New York City. He stated that just before the meeting he had talked to the health official of the town and found, to his surprise, that the infant mortality rate was 165 per 1,000 births, while the baby death rate in New York City at the same time was 97 per 1,000 births. The statement of this relative difference was all the argument needed for the establishment of a baby health station and a program for child hygiene. Within five years this town had cut its baby death rate in half.

Housing and Overcrowding.—It is probable that the two most important conditions that influence health are, first, economic and second, social and hygienic. The latter include decent housing, lack of overcrowding, plenty of fresh air and sunlight, sanitary conditions, and the proper hygiene of the home. We have previously discussed the relation of the home to the health of children. At this moment, in discussing decent housing, we are of course concerned to a large extent with the purely material aspects of the matter, but one cannot give any thought to so important a subject without realizing that here, too, intelligence, or the lack of

it, plays a large part in determining the character of the conditions in which any family lives. It is true, though, that there are certain aspects of the housing situation that may not be altered or controlled by individuals. High rents, lack of decent living accommodations, and the wrong ratio between income and cost of living are matters which reflect upon the community as a whole and can only be altered when the community's conscience is aroused and proper legislation enacted.

Overcrowding is undoubtedly responsible for many infant deaths. One should clearly understand what overcowding means. The picture that naturally arises to our minds is that of huge tenements filled with people, but overcrowding, considered from the health point of view at least, does not consist of the number of people living within any given acreage, nor can it be shown that any congestion of population of this type is reflected either in a high infant death rate or in increased sickness or death during later life. It may be stated in this connection that one of the most densely crowded areas in New York City, bounded by East Third and East Ninth streets, Avenue B to Avenue D, with a population of 42,065, has an infant death rate of 46.7, the lowest of any district of the city, while the area bounded by West 102d and West 106th streets, Eighth Avenue to Riverside Drive, with a population of 5,391, consisting of one of the good residential neighborhoods in the Borough of Manhattan, has an infant death rate of 159.1.

The question of distribution of racial groups in these two districts throws an interesting light on its possible effect upon the infant death rate. In the first district mentioned —that is, the lower east side of the Borough of Manhattan, the population was distributed as follows: native born of native parents, 480; native born of foreign parents, 12,927; foreign born, 28,631. In the second district—on the upper west side of the Borough of Manhattan—the population was grouped: native born of native parents, 2,164; native born of foreign parents, 1,620; foreign born, 1,453.

It is true that the number of people living in a given area may have a relation to overcrowding if the buildings are limited in height, and the result of such limitation is often reflected in having too large a number of people living within a given area of ground space. It is probable, however, that many of the great hotels in our cities house more people in a given ground space than can be found in the same area in a tenement district. When speaking of overcrowding, then, we must consider the density of population in room space rather than in ground space.

Sir George Newman found in England, in a group of families studied, that the death rate was as follows:

	Infant Death Rate
1 room tenement	219
2 " "	157
3 " "	141
4 " " and upward	99

Sir Shirley Murphy has drawn attention to the relation of overcrowding in tenements in the following table:

London 1891–1900

Proportion of population living more than two in a room in tenements of less than five rooms	*Infant Mortality Rate*
Districts with under 10 per cent	142
" " 10 to 15 " "	180
" " 15 to 20 " "	196
" " 20 to 25 " "	193
" " 25 to 30 " "	210
" " 30 to 35 " "	222
" " over 35 " "	223

In the United States similar conditions in the relation between overcrowding and infant mortality have been found to exist. In studies made by the Children's Bureau it was found that the following cities, among others, gave evidence of this relation:

MANCHESTER, N. H.

Number of persons per room	*Infant mortality rate*
Average less than 1	123.1
Average, 1 but under 2	177.8
Average, 2 but less than 3	261.7

AKRON, OHIO

Number of persons per room	*Infant mortality rate*
Less than 1	55.1
1 but less than 2	125.9
2 but less than 3	170.2

Industry.—The relation between the occupation of women in gainful trades, particularly in mills and factories, and the infant mortality rate, is one that has received a great deal of attention. It would seem, on first thought, that there would be little difficulty in showing that when women were employed in certain lines of work during the period of pregnancy and soon after confinement, there might be a definite reaction in their own physical condition, with possibly harmful results to them and to their babies. In a certain sense this can be proved, but the evidence that has so far been obtained can hardly be called conclusive.

The figures for the United States Census Bureau for the years 1910 and 1920 show that during 1910 there were 8,075,772 females of ten years of age and over employed in gainful occupations, a percentage of 23.4. Of these, 2,531,221, or 7.3 per cent, were engaged in domestic and personal service. In 1920 there were 8,549,511 women employed in gainful occupations, or a percentage of 21.1. Of these latter, 2,186,924, or 5.4 per cent, were engaged in domestic and personal service. To further analyze these figures we find that in 1910, 1,820,570, or 5.3 per cent, of the females of ten years of age and over were engaged in manufacturing and mechanical industries. In 1920 there were engaged in the same type of work 1,930,341, or 4.8 per cent. It seems evident that these types of industries are the ones that might be expected to affect the health of women who are employed

in them, and, with the exception of domestic and personal service, they furnished, both in 1910 and 1920, the highest proportion of women workers of any of the types of industry. It would, of course, be impossible to show that the reduction of the number of females employed in manufacturing and mechanical work from 5.3 per cent in 1910 to 4.8 per cent in 1920 has had any effect upon the decline of the infant mortality rate during that period, but it is significant that the proportionate number of women employed in these industries is evidently decreasing.

The health aspect of the employment of women in gainful occupations might be expected to show an effect upon (a) the mother, in her child-bearing capacity and her own health; (b) the health of the baby.

It cannot, in any sense, be assumed or proved that *work*, whether in or out of the home, is necessarily harmful to women, even during the child-bearing period. Indeed, it may be assumed that the proper kind of work during this time may even be considered helpful and wholesome. The main points to be considered in studying the relation between industry and health, with particular reference to the effect of industry upon the health of women during their period of pregnancy and immediately after confinement, are the following:

1. Hours of work. Long hours, too continuous employment, insufficient rest periods, and the consequent mental and physical fatigue and strain.

2. Character of industry, including hazards or possibilities of accidents; the manufacturing of substances having a deleterious effect upon health, such as lead; those trades where poisonous fumes are generated in the process of manufacturing or where the air is laden with lint and dust, as in the manufacture of certain kinds of felt hats, the linen industry, jute and hemp factories, and all others where the air is vitiated by these fumes or dusts. Physical strain involved, such as lifting, stretching, or pushing the body.

3. Sanitary conditions, including the type of ventilation, proper air space and toilet conditions.

4. Conditions relating to the employment of women up to the time of confinement and as soon as possible thereafter.

Sir George Newman has made certain studies in England with regard to this question. In a study that he made of twenty towns in England, ten in which a fairly large proportion of the married women were employed in industry, and the other ten in which a smaller proportion were so employed, he found that in the first group of ten towns where 62 per cent of all of the women were occupied, 21 per cent of these being married, the infant mortality rate was 190 per 1,000 births, whereas in the second group of ten towns, where 58 per cent of all of the women were occupied, 13 per cent were married and of child-bearing age, the infant mortality rate was 153 per 1,000 births. On the other hand, he found that the towns of Northumberland and Durham, in which 32 per cent of the women were occupied, had a high infant mortality rate, while in Dorset, Westmoreland, Herefordshire, and Wiltshire, in which 50 per cent of all women were occupied, the infant mortality rate was low. He states that in studies made for the year 1904 in the towns of Dundee and Paisley it was found that Dundee, in which the largest proportion of occupied women were working in jute and hemp factories, the infant mortality rate was 174, while in Paisley, where an almost equal proportion of women were engaged in the textile trades and dressmaking, the infant death rate was 133.8. Studies were made of sixteen towns in England for the period from 1896 to 1905. Eight of these towns, in which a total of 41.6 per cent of all women between the ages of fifteen and thirty-five years were employed, of whom 7.4 per cent were married or widowed, had an infant mortality rate for this period of 150. Eight other towns where 88.4 per cent of all women of this age group were employed, of whom 43.2 per cent were married or widowed, the infant mortality rate was 182. If these

statistics that have been quoted could be accepted merely at their face value, they would seem to show that the employment of women resulted in a generally higher baby death rate, but Newman, taking into account the many other factors involved, states that "no doubt the factory plays a part, *but the home plays a vastly greater part,* in the causation of infant mortality in the towns where women are employed in the mills."

This point of view is borne out by the reports of various studies made by the United States Children's Bureau. Brockton and New Bedford, Massachusetts, were selected as having a large proportion of women employed in industry. In Brockton the infant mortality rate was relatively low and the report states that this was due to the high wages paid, the intelligence of the mothers, and the good sanitary and hygienic conditions obtaining both in the factories and mills and in the homes. In New Bedford, where the type of industry and the extent of the employment of women could be fairly compared with that in Brockton, the infant mortality rate was found to be higher, and the report draws the inference that this is presumably due to the lower standard of living found in the homes of the employed women in New Bedford and the greater proportion of a foreign element which presented the problem of difficult assimilation. Fall River, Massachusetts, gave a high infant mortality rate, which could be easily accounted for by the conditions found of maternal ignorance of proper child care and feeding. Akron, Ohio, and Saginaw, Michigan, showed a low infant mortality rate with practically no women engaged in industry. On the other hand, in Johnstown, Pennsylvania, the infant mortality rate was excessive, and in this town industrial occupations are not open to women, so that the reason for the high infant death rate had to be sought elsewhere.

I am indebted to Robert M. Woodbury, Ph.D., of the Children's Bureau, United States Department of Labor, for the following abstract of a study recently made by him on

the relation of infant mortality to the employment of women in industry:

The Children's Bureau's studies of infant mortality in eight cities are based upon detailed information relating to 24,000 births. The data secured covered among other things information as to the employment of the mother during pregnancy, and her employment during the infant's first year of life.

Gainful Employment of Mother during Pregnancy.—The influence of the gainful employment of mother during pregnancy upon infant mortality may appear in (1) the stillbirth rate, (2) the neonatal mortality rate, or the deaths in the first month of life per 1,000 live births, (3) the rate from causes peculiar to early infancy, (4) the percentage of premature births, and (5) the infant mortality rate during the first year. The first tests the influence of mother's employment over the mortality preceding or during birth. The next three test the influence of mother's employment over the mortality immediately following birth; this mortality is largely influenced, as is the stillbirth rate, by the care and condition of the mother during pregnancy and confinement. With respect to these, the influence of the mother's employment as a factor affecting mother's condition during pregnancy, and therefore the infant mortality rate, should be more clearly in evidence, since there are relatively few complicating factors. The fifth, the infant mortality rate, is also a useful index since, *other things being equal*, an important influence such as mother's employment during pregnancy would appear in higher mortality rates among infants whose mothers were employed. The difficulty with this test is, since certain important other things are not equal, to frame such a comparison within groups in which these other things are equal, that a valid conclusion can be reached in regard to the influence of mother's employment.

The evidence indicates that mother's employment was associated with markedly higher stillbirth rates than that found for births to mothers who are not employed.

Employment of mother	*Stillbirth rate (per cent.)*
Mother employed away from home	4.9
Mother employed at home	3.5
Mother not employed	3.1

Evidence relating to the neonatal mortality rate, the mortality from causes peculiar to early infancy and the proportion of premature births, is as follows:

(1) Neonatal mortality rate (deaths under one month per 1,000 live births)

Employment of mother	*Neonatal mortality rate per 1,000*
Mother employed away from home	63.2
Mother employed at home	36.7
Mother not employed	43.1

(2) Mortality rate from causes peculiar to early infancy

Employment of mother	*Mortality rate from causes peculiar to early infancy*
Mother employed away from home	50.3
Mother employed at home	27.5
Mother not employed	35.6

(3) Proportion of premature births

Employment of mother	*Per cent of premature births*
Mother employed away from home	6.1
Mother employed at home	3.5
Mother not employed	5.2

In interpreting these results it should be borne in mind that the work of mothers at home consisted largely in keeping lodgers, and that mothers who were not employed in most cases did housework, and hence the comparison as between these two groups is not between mothers who worked and those who enjoyed leisure, but between mothers who kept lodgers and those who did housework, but the group of mothers who were not employed included those mothers who would have been employed except for ill health, consequently this group is somewhat unfavorably weighted as compared with the other two.

(4) Infant mortality rates

Employment of mother	*Infant mortality rate*
Mother employed away from home	176.1
Mother employed at home	114.6
Mother not employed	98.0

The principal question arising as to whether other things are equal is that relating to the father's earnings in families where the mother works as compared with those in families where the mother did not work. Restricting the comparison to families in which the father's earnings were equal and expressing the average infant mortality in all

families as 100 per cent, the mortality in the three groups is shown in the following table:

(5) *Employment of mother*	*Ratio of rate in each group to average (per cent)*
Mother employed away from home	133.7
Mother employed at home	91.9
Mother not employed	93.3

All these methods of comparison show, therefore, that the employment of the mother away from home is associated with higher mortality among the infants; not only the stillbirth rates among births to mothers employed away from home are higher, but also the neonatal mortality rate, the mortality from causes peculiar to early infancy, the proportion of premature births, and the infant mortality rate when families with equal father's earnings are compared, are much greater in case the mother was employed away from home than in case she was not so employed.[1]

Mother's Employment during First Year of Infant Life. The analysis of the influence of mother's employment during the infant's first year of life upon infant mortality is complicated by the necessity of comparing the mortality among infants after their mothers have gone to work, with the mortality of other infants of the same ages. The easiest way of stating this comparison is to compare the actual number of deaths subsequent to the beginning of employment among the infants whose mothers are employed with the number of deaths that would have been expected at the mortality rates prevailing among infants whose mothers did not work. The result of such a comparison in the material secured in the eight cities shows that the mortality among infants whose mothers were employed away from home was 2.5 times the average among infants of the corresponding ages, while the mortality among the infants whose mothers were employed at home was practically the same as that among all infants (1.1 times as high). A much larger proportion of the mothers in families in which father's earnings were low were employed away from home than of mothers in families in which father's earnings were high. When the mortality among infants whose mothers were employed away from home is compared with that among all infants at the same ages and in the same father's earnings groups, it appears that the mortality among infants whose mothers were employed away from home was only 1.6 times the average rate.

[1] The figures are quoted from Causal Factors in Infant Mortality: based on results of field studies in eight cities, by Robert M. Woodbury, a bulletin which will shortly be issued by the U. S. Children's Bureau.

In other words, a considerable part of the excess mortality among these infants was due to the high mortality which characterizes low economic status; but a considerable excess mortality still remains after this factor has been accounted for. The analysis shows further that the infants of mothers who were employed away from home the first year of the infant's life were artificially fed in a much larger proportion than other infants, probably in part at least a result of the mother's employment away from home.

Laws forbidding the employment of women for a stated period before and after child-birth have been enacted in five of our states—in Massachusetts in 1911, in New York in 1912, in Connecticut and Vermont in 1913, and in Missouri in 1919. The periods vary during which gainful employment is forbidden, ranging from two to four weeks before and from four to six weeks after confinement. In none of these laws is there any provision for payment of wages or maternity benefits during this period of enforced idleness.

The confusion that exists in our minds with regard to this subject is natural, but our inability to show conclusively the exact relation between the employment of women and their health or the effect of such employment on the infant mortality rate is undoubtedly due to the fact that we have neglected to give proper weight to the reasons why married women enter industry. Of course there are a certain proportion of women who are employed because of their desire for economic independence. Our concern, however, is with the large group who find it necessary to earn money because their husbands are unable to support them. Poverty, then, must be considered as the main reason why women work in factories, mills, or allied types of industry. We have every reason to believe that this poverty implies a low standard of living; it only too often goes hand in hand with ignorance. In communities where poverty is extensive, it is possible that the infant mortality rate would be high in any event. We also have every reason to infer that if the poverty in the home is extreme, the employment of the mother and the resultant increase in the family income usually mean better

food for herself, and a higher standard of living that may easily result in a lower infant death rate.

The real effect on the baby death rate as a result of employment of their mothers would seem to be due to the lack of proper prenatal supervision and care, and direct injury due to a hazardous type of occupation, the necessity of artificial feeding for the infant instead of breast feeding, and the possible neglect of the infants owing to the absence of their mothers from home.

Unhygienic Conditions.—It is difficult, if not impossible, to state with any degree of accuracy the relation between unhygienic conditions and the infant death rate. There are many factors involved. The question of how the infant is fed is an exceedingly important one in this regard. It has been found that infants who are breast fed will thrive even in insanitary surroundings, while bottle-fed infants will die at an early age if subjected to the same conditions. This has been particularly well demonstrated in the work of boarding out foundling babies in private homes. It has been found in that connection that it is perfectly safe to place breast-fed infants in homes having little to recommend them from a sanitary point of view, provided that the foster-mother is healthy, has a good supply of breast milk, and is willing to follow the simple routine of hygienic care of the baby. In boarding out a bottle-fed infant, however, the sanitary conditions of the home are of vast importance. Uncleanliness and carelessness are not a good basis upon which to lay the program for the proper care of the bottle-fed infant. They are not desirable even in the case of breast-feeding, but certainly in the latter they can do little or no harm while in the former they may be extremely serious. It is doubtful if filth alone causes disease, but the conditions that cause filth cause disease without doubt. Dirty homes, lack of ventilation, and filthy habits of living are necessarily reflected not only in diminishing the physical resistance to disease, but also in increasing the possibility of infection of various types. There have been many studies

made in many communities to show this relation between unhygienic living conditions and the infant mortality rate. It must be understood, however, that in presenting such figures there is no intention of saying that dirty houses or dirty rooms, *per se*, actually cause the death of babies. Their significance lies rather in the lowering of the general standard of living and the indication of the habits of the family. With these reservations, it is interesting to note that in the investigation made in Johnstown, Pennsylvania, it is stated that if the family lived in clean rooms the infant mortality rate was 113.5, while if the family lived in dirty rooms the infant mortality rate was 186.

Illegitimacy and Infant Mortality.—The relation of so-called "illegitimacy" to infant mortality is a definite one. The rate among babies born out of wedlock in the United States in 1921 varied from 4.2 per 1000 births in Rhode Island to 81.6 in South Carolina. Other states showing a high rate were Mississippi, 69.9; Virginia, 55.6; Maryland, 52; North Carolina, 51.8; and the District of Columbia, 58.5. All of these states have a very large colored population and the proportion of such births among the colored people is extremely high. Births out of wedlock in the United States, based upon the nativity of the mother, ranges from 7.9 of mothers born in Denmark, Norway, and Sweden to 1.5 for mothers born in Italy. The low "illegitimate" birth rate in the United States as compared with similar birth rates in practically all foreign countries is probably due to the fact that illegitimacy is not generally reported in this country. In fact, our statistics regarding it have little value.

The studies regarding this matter are not extensive, but they are conclusive. Tatham of England has reported that in 1902 the situation as regards the infant death rate of legitimate and illegitimate children was as follows.

This high death rate among the illegitimate children was more marked during the first three months of life. In this period the deaths occurring under one month exceeded those

London				Rural counties			
Males		Females		Males		Females	
Legitimate	Illegitimate	Legitimate	Illegitimate	Legitimate	Illegitimate	Legitimate	Illegitimate
151	289.3	118.7	264.1	125.6	190.2	98.8	166.1

of the next two months, and of the deaths occurring in the first month, the highest proportion took place during the first week. It may also be noted from this table that the mortality rate for the illegitimate babies in London was twice as great as that found in the rural communities.

Figures on comparative mortality rates of legitimate and illegitimate births in the United States as a whole are not obtainable, nor have we any dependable figures on this subject in any of the individual states. The United States Children's Bureau, however, has made certain studies of this question and reported that in Boston, in 1914, the total death rate among legitimate babies was 95 per cent, and among illegitimate 281 per cent. That is, the death rate was three times as great if the babies were born out of wedlock. In Baltimore, in a study of white infants, it was found that the death rate among legitimate babies was 95.9, while the death rate among illegitimate babies was 315.5, or three and three-tenths times as great. In the report of the health officer of the District of Columbia for the year 1913 it is stated that during 1912 the death rate of white babies of legitimate parentage was 79.7, while the death rate of white babies of illegitimate parentage was 302.7. It is evident, therefore, that the death rate of babies born out of wedlock is anywhere from three to four times as high as the death rate of infants whose parents are married. It is easy

to see why this should be so. Illegitimacy usually implies the early separation of the baby from his mother. In such cases there are often great social and economic disabilities of the mother. Added to this may often be found maternal indifference. The vast proportion of these deaths occurring in the early part of the infants' life undoubtedly show the effect of parental conditions. The worry, mental and nervous strain of the mother, due in many instances to her inability to earn a living, naturally result in low vitality of the baby and its early death from inanition. When we consider that many of these babies are abandoned, that they are in greater part artificially fed, and that they rarely have the care of their own mothers, the high infant death rate seems inevitable. We must, too, consider that various forms of slow infanticide are only too frequently practiced.

The effort to give the child born out of wedlock his rightful status has assumed large proportions. It is mentioned here only because of its great significance. Necessarily the subject cannot be discussed at length. The significance, however, of legislation regarding this matter, as far as infant mortality is concerned, lies in the fact that the removal of the stigma of immorality from the mother and the baby and the recognition of the baby's proper status, including the provision whereby it may be properly cared for by its parents, will undoubtedly have a distinct effect in lowering the baby death rate among this class of infants.

Norway was the first country to afford legal recognition to the rights of the so-called "illegitimate child." Norway gives the child born out of wedlock equal right to the name of the father and the mother. The law provides that the mother shall have the custody of the child, unless the best interests of the child indicate that the father be given the custody. The parent having the custody is also the guardian. Further provisions are that the responsibility for the care and maintenance of the child shall rest upon both parents in accordance with the economic status of the one most favor-

ably situated. The so-called "illegitimate child" has also the same right of inheritance as the legitimate.

In the United States, Minnesota, Massachusetts, Illinois, Maryland, Ohio, and Pennsylvania have accorded legal recognition to the rights of the child born out of wedlock. Briefly, the importance of these laws is as follows:

Name.—Minnesota, Massachusetts, Illinois, Maryland, and Ohio do not specify whose name the child shall take. By custom the child usually takes the name of the mother.

Custody and Control.—Illinois provides that the mother shall have the custody until the child is ten years of age, unless the court finds her unsuitable. The other five states have no general statutory provisions. Minnesota and Massachusetts provide that in adoption cases the consent of the mother only is necessary, except that the adjudged father of the abandoned child must be notified of the adoption proceedings. Maryland forbids separation of the child under six months of age from its mother, unless necessary for physical reasons.

Care and Maintenance.—Pennsylvania's law makes both parents liable for the support of the child. Minnesota—the mother is liable for the support of her child under the Abandonment and Desertion Law. The Illegitimacy law makes the person adjudged the father liable to all the obligations imposed by law upon the father of a legal child. Massachusetts, under the Non-Support Act, charges the mother as well as the father with maintenance of the child. Illinois and Ohio place the responsibility for maintenance upon the mother under the Desertion Act, and provide for support from the father under the Bastardy Act.

Inheritance.—Minnesota provides that the illegitimate child shall inherit from the father if parentage has been acknowledged in writing, with competent witnesses. All of the six states provide for inheritance from the mother. In Maryland, if the father dies before the child is twelve years of age, the court may accord payment from his estate of an

amount not exceeding $500, but not more than one-half the estate, a legitimate child would receive.

The term "illegitimacy" as applied to infants should be forever debarred. Certainly, if there is any illegitimacy at all about the fact that the baby has been born out of wedlock, the term should be applied to the father and mother, and it is to be hoped that its use in connection with a helpless and innocent child will soon disappear. Probably the only reason why we have branded the baby in this way as long as we have is because we have not yet coined any term which gives us the information that the child is not an offspring of a legal marriage. For the purpose of vital statistics and for health, social, and legal reasons it is necessary to have information regarding the child's parentage and whether or not a marriage has occurred, but outside of these points the adjective should be dropped entirely. As far as the child is concerned, there can be no such thing as an illegitimate birth, and the branding of any child in this way is a crime against every decent social instinct.

Race.—No program for the reduction of the infant death rate should be put into effect until the racial character of the population is considered. The type of work to be carried on, whether it be prenatal or postnatal, or both, will be largely determined by a study of the death rates from different causes and in different age groups, with particular relation to the nationality and racial strains, as shown by the nativity of the mother. It is only by taking the racial relation to disease and death into account that we can formulate an intelligent program. That racial groups have either a certain predisposition, or lack of resistance, toward certain diseases is apparent. It is probable that we may trace this lack of resistance to the habits of living of certain foreign-race groups in this country. As an example, for many years we have had a large Italian immigration. Nearly all of these Italians have come from the south of Italy and from Sicily. They have been accustomed to living and working out-of-doors, in a climate which permitted this through-

out the greater part, if not the whole, of the year. They are a people who have lived mainly by agriculture. In this country, these same people shut themselves up in tenement houses in our great cities, the women going out only for marketing or possibly a little visiting with their friends, the men doing hard manual labor such as ditch-digging, tunneling, or heavy construction work. The overcrowding, lack of fresh air, and marked change in living habits and conditions are reflected in decreased physical resistance, and in the high death rates of contagious and respiratory diseases that are found not only among Italian infants and children, but among the adults.

No well-founded child-hygiene program can fail to take cognizance of the different preferences and habits of living in the different race groups in their changed environment. Not only must we be entirely familiar with the relative disease distribution among the different races but we must also be intelligent regarding the habits of living of these race groups in their own countries, and their same kind of habits when living under the conditions found in the United States, whether they be rural or urban.

It may be well, in this connection, to call attention to the other side of the picture. While certain race groups have a lessened resistance to certain types of disease under the changed living conditions that they must adopt in this country, it is nevertheless true that the infant mortality rates of these races in this country are distinctly lower than the rate in their home countries.

Medical or Terminal Causes of Infant Mortality.—In the birth registration area of the United States there were, in 1921, 129,588 infant deaths. The causes of these deaths were given as shown in the following table. It is possible to group these diseases in seven classifications, and such a grouping gives us a more definite light upon their significance and the methods we may use in preventing their occurrence:

The primary conditions resulting in the terminal causes of death as given above are those that have already been

INFANT MORTALITY IN THE UNITED STATES BIRTH-REGISTRATION AREA, 1921, BY GROUPS OF CAUSES OF DEATH

	Birth registration area 1921	
	Number	Per cent distribution
Gastric and intestinal diseases	24,845	19.2
Respiratory diseases	16,589	12.8
Congenital malformations	10.501	8.0
Early infancy	50,093	38.7
Contagious diseases	11,024	8.5
External causes	1,651	1.3
All other causes	14,885	11.5
Total	129,588	100
Another grouping		
Congenital diseases	50,093	38.7
Gastric and intestinal diseases	24,845	19.2
Respiratory diseases	16,589	12.8
Contagious diseases	11,024	8.5
All other causes	37,037	20.8

mentioned. Some consideration has also been given to the secondary causative factors resulting in actual disease. These causes are so intimately related to the methods that need to be followed for their prevention and the consequent reduction of the infant sickness and death rate that they will be discussed in the next chapter. At this time a brief résumé of the causes under which this group may be summarized is as follows:

The gastric and intestinal diseases of infancy are caused by all environmental conditions which tend to lower the standard of living, the presence of insanitary and unhygienic surroundings, lack of proper care, or any factors which tend

to lower the physical resistance of the baby. Added to these must be placed the exciting causes of gastro-intestinal disorders which, in infancy, are almost invariably either the use of unsafe or impure milk or improper methods of feeding. *The respiratory diseases* in infancy have as underlying causes the insanitary and unhygienic conditions that have been mentioned, with particular reference to lack of proper ventilation in the home, the latter affording increased opportunity for the transmission of infectious organisms which might be considered the exciting cause of the disease. *The contagious diseases* are caused by almost the same conditions that contribute to the occurrence of the respiratory diseases. In fact, a large number of the cases of respiratory diseases in infancy are secondary to the occurrence of contagious disease. In living conditions are included the factors of overcrowding, lack of ventilation, and environment which tends toward lowered vitality, providing a favorable opportunity for the rapid dissemination of the infectious or contagious diseases of infancy. The mere presence of the infectious organism does not necessarily mean that the child will have the disease in question. The organism needs proper soil and the other factors that are essential for its growth. All organisms thrive best when given moisture, warmth, quiet, darkness, and a proper culture medium in which to grow. Such conditions are rapidly afforded in homes that are humid or damp, whether this is a condition inherent in the building or due to the indoor degree of temperature and humidity, with lack of proper ventilation. Lack of cleanliness, allowing the accumulation of dust or filth on the floors and walls, the absence of sunlight and free ventilation, and the lowered resistance of the child, due to unfavorable living conditions, lack of personal hygiene, or improper diet, are all contributing causes. *The diseases of early infancy* include prematurity, lack of vitality, and what is known as "congenital debility," including the deaths that occur during the first month of life, which are depend-

ent upon prenatal conditions affecting the health of the mother before the child is born.

Practically all of the causes of infant mortality are interrelated and dependent upon one another. In the statistics that have been quoted due allowance must be made for the fact that no one condition, no matter how deleterious in itself, will really cause disease. The results of any one of these conditions may be varied and complex. The causes leading to such conditions may be equally varied. Many or all of them may react upon the baby. Poverty alone will not cause infant mortality; neither will wealth alone prevent it. Ignorance alone may cause infant mortality, but innate intelligence, without the facilities for applying the methods that are essential, may not be able to assure good health for the baby. Yet, if one were to place any particular emphasis upon the greatest factor in the causation of a high infant death rate, the inclination would be to stress ignorance.

It has been a common practice in the past to make some such trite statement as "in the last analysis every mother must save her own baby." True it is that upon the mother rests the heaviest responsibility in this regard, but a mother, unaided, may find this a difficult and sometimes almost an impossible task. The responsibility for the infant death rate in any community rests squarely upon all of the citizens of that community. The community must provide the mother with the facilities and the tools that she needs. The mother must be intelligent enough to use them. The causes of infant mortality will not be eradicated solely through education of the mothers, although undoubtedly that is an essential feature and the one that demands immediate attention. Back of this must come community support. The community conscience which will eradicate these conditions which lead inevitably to a high baby death rate is an index of good municipal housekeeping.

CHAPTER VIII

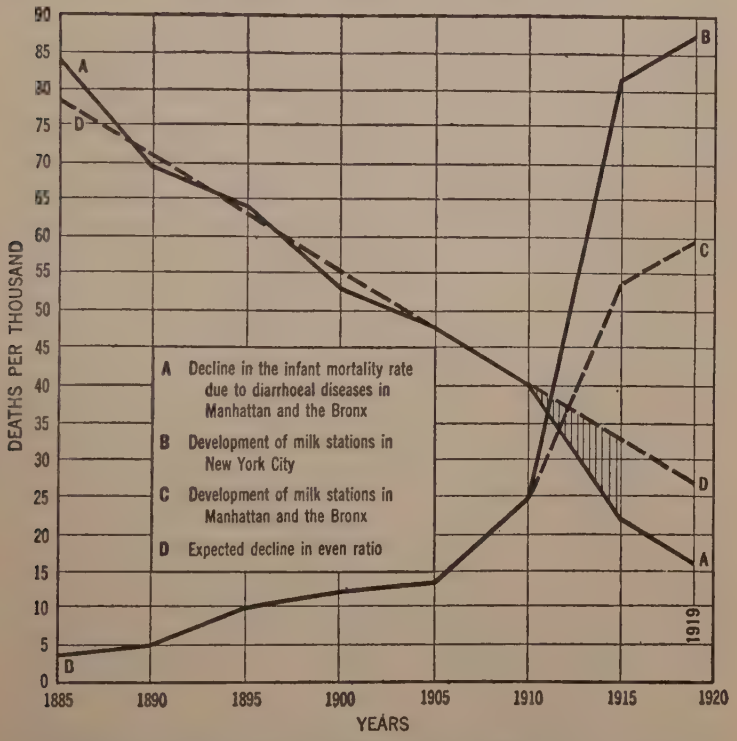
THE BABY

The Reduction of Infant Mortality

Any program for the reduction of infant mortality, to be effective, must be directed toward the reduction of infant morbidity, or illness. We have seen how many and complex are the factors in living that affect the health and well-being of babies. An attempt to reduce the baby death rate by the simple expedient of treating sick babies is, of course, of little account. One need not underestimate the importance of proper treatment when making such a statement as this. It is necessary that sick babies should receive the very best of medical and nursing attention. Pediatrics has made rapid advances in the past twenty years. Our knowledge of infant feeding and of the treatment of the diseases of babies and children has progressed to the point where we may almost call it an exact science. However, the fact remains that we cannot expect any marked reduction in the baby death rate without a proper adjustment of the many social, economic, and sanitary problems that we have discussed in the previous chapters, and added to these must be an intelligent use of what we call "public health education."

Summing up the forces which cause infant mortality in a way that they may be used as a background for our programs for prevention of baby sickness and death, we may consider the two groups who control these forces and who therefore must take part in their proper adjustment. First, we have the community as a whole. Here we must fix the responsibility for decent housing, proper sewage disposal, a

safe and pure milk and water supply, opportunities for outdoor recreation, proper living conditions, and the adjustment of economic forces so that they will provide a living wage for all families. Second, we have the individual father and mother, who must be taught to make use of the com-



The relation of baby health stations to the decline in the death rate from diarrhoeal diseases[1]

[1]Graph by Ernst C. Meyer, Ph. D.

munity resources and to so apply them in their own family that their baby may receive the greatest degree of protection and be assured of good health.

The death rate as a whole in all countries has shown a marked reduction in the last fifty years. Generally speak-

ing, this reduction has been progressive, although the occurrence of epidemics at certain times has been reflected in slight increases which were corrected, once the epidemic had subsided. The infant mortality rate has shown a similar reduction. The accompanying graph shows the manner in which the infant death rate from diarrhœal diseases has declined in New York City during the period from 1885 to 1920, inclusive. A capable and far-reaching analysis of the reduction in the infant death rate in New York City, extending over a period of over thirty years, has been compiled by Dr. Ernst Christopher Meyer, of the International Health Board. No other studies of this extent have been found available, but it is probable that the decline in the infant death rate in New York City has been the result of factors quite similar to those responsible for a like decline in other cities, towns, or rural communities.

The influence manifested during the first decade, as shown by these statistics, was one that mainly pertained to improved sanitation.

Reference has been made to the fact that the infant is exceedingly sensitive to his environmental condition. Any improvement in environment will be reflected in a lower death rate. The decline in the infant death rate, therefore, during the decade in question, would seem to have been the result of the improvement in the social, economic, and sanitary conditions that have so definite an effect upon the welfare of all individuals. At the end of this decade the effect of this improved sanitation seemed to have reached its climax. Whatever imprint such improved conditions might make upon the infant death rate had been made, and it could no longer be expected that this decline would continue without the introduction of some new factor.

At this time, or about 1898, the city of New York began a widespread program to (a) improve the water supply, and (b) improve all of the conditions surrounding the provision, distribution, and care of the milk supply. There can be no question that the assumption by the health authori-

ties at this time of all responsibility for the type of milk to be sold within the city limits was a further impetus for the reduction of the baby death rate. The tendency toward pasteurization of the milk supply, which had been urged by Nathan Straus since 1893, was rapidly becoming a necessity, owing to the impossibility of controlling the sources of the milk supply of so large a city.

DECLINE IN INFANT MORTALITY RATES, BY CAUSE OF DEATH, 1915 to 1921

U. S. BIRTH-REGISTRATION AREA AS OF 1915, EXCLUSIVE OF RHODE ISLAND

Cause of death	Per cent decrease 1915–1921
All causes	21.0
Gastric and intestinal diseases	34.6
Respiratory diseases	32.2
Malformations	10.0
Early infancy	10.8
Other communicable diseases	21.7
External causes	20.2
All other causes	23.5

Decrease in the Infant Death Rate in the United States Birth-registration Area.—For the period 1916 to 1923 inclusive there was a marked decrease in the infant death rate in the birth-registration area. In 1916 the infant death rate was 101; in 1917, 94; in 1918, 101; 1919, 87; 1920, 86; 1921, 76; 1922, 76; 1923, 75.6. This represents a decrease of approximately 25 per cent in the eight-year period. A detailed analysis of this decline in the infant mortality rate in the birth-registration area covering the period 1915 to 1920, inclusive, has been made by Robert Morse Woodbury, Ph. D., Director of Statistical Research of the United States Children's Bureau, who published an article on this

subject in the *American Journal of Public Health* for May, 1923.

For the next decade, that is, from 1898 to 1908, a marked reduction occurred in the infant death rate, due, without question, to this provision of a safer milk supply for babies. At the end of this period, however, the same tendency was observed that had been found in the previous decade—that is, the baby death rate seemed to have reached a minimum level, and it was evident that no great reduction could be expected for the future as the result of a safe, sanitary, or improved milk supply.

At this time (1908) the Bureau of Child Hygiene in New York City was organized and an intensive program for the education of mothers was begun. This was carried on by the use of visiting physicians, nurses, and, within a few years, baby health stations. The keynote of this organization was, and is to-day, educational.

As might have been expected, this new force brought about another sharp decline in the infant death rate. During the past few years there has again been a tendency for this decline to become static. It is probable that any further great reduction in the infant death rate must come about through the introduction of methods for lowering the death rate for congenital diseases. In other words, over 40 per cent of the baby death rate now occurs during the first month of life. That this may be reduced from one-third to one-half has been proved many times. The value of further efforts in this direction would, therefore, seem obvious.

As further indication of the value of organized work for the prevention of infant mortality in a community, the statistics of New York City for the period from 1902 to 1923 inclusive may be taken. This decline may be viewed at five-year intervals: 1902 infant death rate, 181; 1907—160; 1912—105; 1917—88.8; 1922—72.3; 1923—66.4.

Since 1907 the baby death rate in New York City has been reduced 54 per cent—from 144 in 1907 to 66 in 1923 per 1,000 reported births. Since 1902, or during the period

of the past twenty-one years, this rate has been reduced practically two-thirds. These figures are given simply as an indication of what may be accomplished as a result of organized child-hygiene work. The prophecy made by many child-welfare workers at the time this work was commenced, to the effect that it was reasonable to expect that the baby death rate might be cut in half, has been shown to be a comparatively simple achievement. A reduction of two-thirds has been accomplished, and if such a reduction can be shown in a city like New York, under the most adverse conditions obtaining anywhere in the United States, it may reasonably be expected that such a record should be excelled by practically any community, whether urban or rural, in this or any other country.

It may be noted here that the reduction in the infant death rate in New York City has not resulted in the survival of the unfit. The statistics as to the decreasing mortality in the older age groups of childhood bears out Doctor Holt's statement that "it is not the unfit, but the unfortunate, baby that dies." During the period from 1909 to 1923 the reduction in the infant mortality rate in New York City was 52 per cent. The reduction of the death rate between one and two years was 74 per cent and between two and five years 61 per cent. The total reduction in the death rate under five years was 60 per cent. This would seem to be clear evidence that the methods used for the reduction of the baby death rate resulted not only in the saving of life during the first year, but in the assurance of such sound health and physical resistance to disease that a continued decrease was shown in the death rates of the older age groups, notwithstanding the comparatively minor efforts that were directed toward improving the health of the child between the period of infancy and the period of school life.

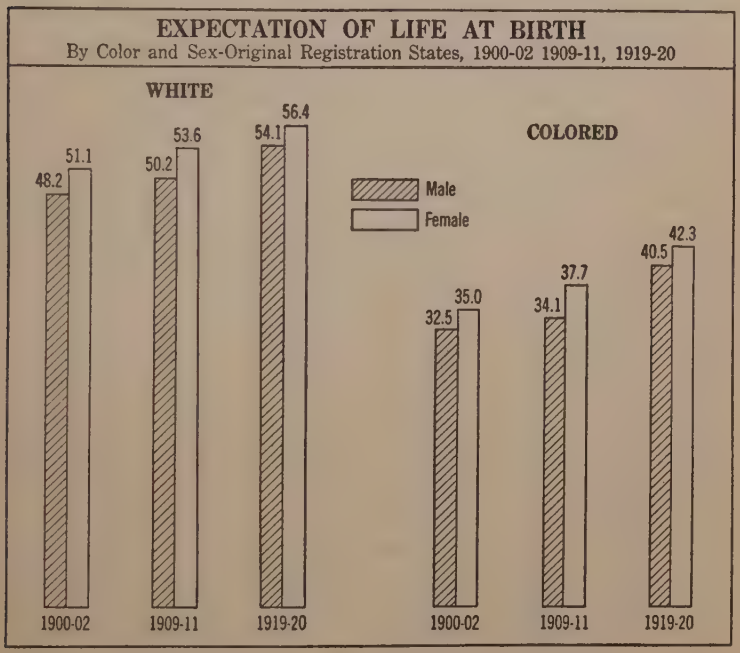
According to the law of diminishing returns, we know that the reduction in the baby death rate from 200 to 150 may be achieved with little effort. From 150 to 100 will need an added impetus, while any reduction that takes place

DEATHS AND DEATH RATES PER 1,000 POPULATION AT AGE GROUPS UNDER FIVE YEARS—NEW YORK CITY

Year	Under one year		One to two years		Two to four years		Under five years	
	Deaths	Rate per 1,000[1]	Deaths	Rate per 1,000[2]	Deaths	Rate per 1,000[3]	Deaths	Rate per 1,000[4]
1909.....	15,976	137[5]	4,740	50	3,803	13	24,519	49
1910.....	16,215	126	4,351	45	3,702	13	24,268	48
1911.....	15,053	112	3,878	39	3,311	12	22,242	43
1912.....	14,289	105	3,633	36	3,056	10	20,978	30
1913.....	13,780	102	3,703	36	3,228	11	20,711	39
1914.....	13,312	95	3,387	32	2,831	9	19,530	37
1915.....	13,866	98	3,590	34	2,835	9	20,291	38
1916.....	12,818	93	3,578	33	3,571	12	19,967	37
1917.....	12,568	89	3,092	28	2,605	9	18,265	33
1918.....	12,657	92	4,302	39	4,060	14	21,019	38
1919.....	10,639	82	2,453	22	2,652	9	15,744	28
1920.....	11,340	85	3,205	28	2,743	9	17,288	31
1921.....	9,548	71	1,910	16	2,214	7	13,672	24
1922.....	9,548	75	2,759	23	2,422	7	14,847	25
1923.....	8,578	66	1,562	13	1,692	5	11,839	20
Average rate for five years, 1909-1913, inclusive...		116.4	.....	41.2	.....	11.8	.....	41.8
Average rate for five years, 1914-1918, inclusive...		93.4	.....	33.2	.....	10.6	.....	36.6
Average rate for five years, 1919-1923, inclusive...		75.8	.....	20.4	.....	7.4	.....	25.6
Decrease between groups 1 and 2..		19%	.....	19%	.....	10%	.....	12%
Decrease between groups 2 and 3..		19%	.....	38%	.....	30%	.....	30%

[1] 1910 to 1923, based on number of reported births.
[2] Based on estimated population at one year.
[3] Based on estimated population at two to four years, inclusive.
[4] Based on estimated population under five years.
[5] 1909, based on estimated population.

below 100 must inevitably be the result of intensive educational work, added to the factors that have been responsible for the previous reduction. A reduction in the death rate of 10 points when it is already below 100 can be achieved only by the expenditure of time, effort, and money, five or six times as great as that necessary to reduce the baby death rate 50 points when it is ranging from 150 to 200.



Increased Expectation of Life at Time of Birth.—Rollo H. Britten, junior statistician of the United States Public Health Service, has published some interesting data regarding the increased expectation of life at different ages. In connection with the subject of child hygiene, one of Mr. Britten's tables and his comment thereon is of interest. He states that "it is evident that, so far as expectation at birth is concerned, the decade 1910-20 has witnessed the same general progress as the previous decade. The females still

have a better expectation than the males, in both white and colored populations. The colored show even more improvement than the white in expectation at birth in the past ten years. In general it may be said that they have about the expectation at birth which the white had thirty or forty years ago. Since the 1919-20 data cover years in which influenza was epidemic, the real gains are presumably greater for both white and colored than those indicated in the graph."

Public health work for the reduction of infant mortality is concerned with all of the factors we have discussed above. In a general way, all work that is done for the improvement of the sanitary condition of a community shows its effect in a reduction of the baby death rate. But, in perfecting any type of organization for reducing infant mortality, it is necessary to have definite methods of preventing illness from the different types mentioned in the disease groups. We must consider, then, the methods whereby we may reduce infant mortality as a whole, and in the following groups: (a) congenital diseases, (b) diarrhœal diseases, (c) respiratory diseases, (d) contagious diseases, (e) all other causes.

The Reduction of Infant Mortality From All Causes.—It is evident that any efforts made to keep babies well will reduce the total infant death rate. The problems that are involved in the reduction of the baby death rate as a whole are those that are encountered in the whole field of public health. Improved sanitation and living conditions are possibly the first that need attention. In a community where the baby death rate is high and no comprehensive efforts have been made to reduce it, and where the sanitary conditions are bad, there can be no doubt that a marked diminution of this rate will occur as a result simply of a general clean-up. Clean streets, proper garbage and refuse disposal, and better housing will be reflected in a lower death rate from the diarrhœal, contagious, and respiratory diseases. Any community effort that will improve these conditions will be effective in baby saving.

The relation of a pure milk supply to infant mortality will be discussed later, but it should be stated here that, while the encouragement of breast feeding is one of the most effective ways of reducing the baby death rate, we must remember that if a baby must be artificially fed, the community must provide an adequate supply of pure and clean milk for this purpose. Granted that every effort has been made to adjust and make safe the sanitary and hygienic conditions in the community, and to deal with the social and economic questions in a way to effect at least some improvement, certainly the next step is that adjustment whereby every mother is allowed to care for her own child. If we have then paid due attention to the community methods we have outlined, our next step will be the intensive education of the mothers. The latter question, as well as the methods of dealing with each disease group, must receive detailed attention, but even if the community feels unable to carry on a comprehensive program for baby saving along the detailed lines, it will be possible to make a definite impression on the baby death rate by improvement of the public-health program as a whole.

Congenital Diseases.—Before we can determine the exact methods of reducing the infant mortality rate from congenital diseases, we must analyze this subject a little further in order to find out just where our efforts should be directed. Generally speaking, what are called "deaths from congenital diseases" are those that occur mainly in the first months of life and are definitely the result of some condition affecting the health of the mother before the birth of the child. They include what is known as "prematurity," which causes the largest number of these deaths. This term is generally used to indicate low vitality, and does not mean that the baby is born before the time it is expected. It does mean, however, that the baby is immature. This feeble vitality which does not allow the baby to live occurs because the mother has not been able to furnish her child with sufficient nourishment or the strength to survive. The

deaths classified as "congenital" may be caused by any condition that affects the health of the expectant mother, or her care during her confinement.

Such conditions may be any of those that we have discussed in the previous chapter or may be due to lack of proper personal hygiene during pregnancy. Living in overcrowded and ill-ventilated rooms, physical fatigue, lack of proper food, lack of attention to getting rid of the waste products of the body, an insufficient amount of rest and of fresh air, indeed everything that interferes with personal hygiene, will react so seriously upon the health of the mother that her baby will have little chance to survive.

We must also consider that there are certain complications of pregnancy which may injure the mother's health, and certain diseases not necessarily concerned with pregnancy, such as tuberculosis and syphilis, which will also have an effect upon the baby. The other causes of deaths which are classified under the general heading of "congenital" are the accidents of labor and other causes that are influenced by obstetrical practice and congenital malformations of the baby. These are not, strictly speaking, a public-health problem. The latter group is one which cannot be reached by any amount of prenatal care. Throughout the United States the deaths in the first group, or those due to prematurity or feeble vitality, comprise about 65 per cent of the total deaths from what are known as "congenital diseases." Injuries at birth furnish about 22 per cent, and malformations of the baby about 13 per cent.

Considering the deaths due to prematurity and the causes of these deaths, we may see that the main part of our efforts will be directed toward reducing the death rate in this particular group. It is probable that the deaths from injuries at the time of birth can be reduced in part by better obstetrics, and it is also probable that the deaths in the group of malformations of the baby cannot be reduced at all, but it is safe to assume that at least 65 per cent of the deaths from congenital diseases, occurring mainly during the first month

of life, may be prevented, provided the right methods are universally applied. These methods are those that are usually summed up under the title of "prenatal care."

Prenatal Care.—Prenatal care includes all efforts that are directed toward assuring the health of women during their period of pregnancy, and the proper supervision and care during their confinement and lying-in period. The results of prenatal care should be shown in (a) fewer stillbirths and miscarriages, (b) a low maternal mortality rate, (c) improved health for the mother both before and after the birth of her child, and (d) reduction of the baby death rate during the first month and from congenital diseases at any age.

The history of prenatal care in this country has already been discussed. The methods that are used, in detail, may be summed up as follows:

(1) Community adjustment necessary—
   - (a) proper federal and state laws for the protection of maternity and infancy;
   - (b) readjustment of the sanitary, hygienic, social, and economic conditions in the community;
   - (c) provision of a proper milk supply.

(2) Education and supervision of expectant mothers. This may be accomplished by the provision of—
   - (a) maternity centers;
   - (b) visiting nurses;
   - (c) pamphlets on prenatal care and the use of prenatal letters.

The credit for first instituting the type of work which is known at the present time as "prenatal care" belongs undoubtedly to the Woman's Municipal League of Boston. This work was begun in the spring of 1919. A consultation center modeled somewhat on the Consultat de Nourrisson of Professor Budin, was established previously by Doctor Hill of New York, and conducted under the name of "Doctor Hill's Maternity Clinic." In discussing

priority in a matter of this kind, one should not omit to state that some physicians have always considered prenatal care essential. The instances of such supervision by private physicians, however, are isolated. As a result of five years' work, the Woman's Municipal League reported that their nurses had made 12,984 visits through which the cases cared for were 1,512, and the babies born of these mothers numbered 1,522. In this group there were no maternal deaths during pregnancy and but nine maternal deaths from confinement, which was only six-tenths of 1 per cent of the total number confined. The percentage of miscarriages was a trifle under .2 per cent. The cases of eclampsia numbered four, or .2 per cent. The number of premature births averaged 1.7 per cent of the total number of births. The proportion of stillbirths was less than one-half of the rate for the city of Boston. The deaths of babies under one month was 43 or 2.8 per cent, for the five years from 1909 to 1914, whereas for the city of Boston for the year 1913 the baby death rate for this age group was 4.3 per cent. A follow-up of the babies during the first month of life showed that 84.7 per cent were breast fed, 4.5 per cent were given mixed feeding and 10.8 per cent were bottle fed.

The Maternity Center Association of New York City is one of the best organized and most efficient associations of its type. Its history and program are briefly considered in this extract from the report of this association from April, 1918, to January, 1922, where it is stated that "the first consistent effort in preventing these deaths (congenital diseases) by caring for the mothers before the babies were born was the result of the gift of George H. T. Schroeder to the Association for Improving the Condition of the Poor. This gift was made in June, 1907, and provided sufficient funds to enable two nurses to carry on prenatal work. In 1915 Dr. Haven Emerson, then the Health Commissioner of New York, organized a small committee to make an analysis of the facilities for maternity care in New York City. This

committee consisted of Dr. J. Clifton Edgar, Dr. Philip Van Ingen, and Dr. Ralph W. Lobenstine. Their survey showed that, although several agencies were doing some prenatal work, there was no uniformity in that work, as it was not co-ordinated in any way and a comparatively small number of pregnant women were receiving care. It was found that the hospitals of the city cared for about 30 per cent of the deliveries. Midwives cared for about 30 per cent, and of the other 40 per cent, 10 per cent were cared for by private physicians who might be classified as obstetricians, and the remainder by general practitioners. In no case was adequate prenatal care found on any scale warranting attention.

"As a result of this survey the Women's City Club of New York City in 1917 financed the first maternity center. Later, the New York Milk Committee developed two additional centers of this type. Since that time the development of this association has been progressive. Its literature on the subject of prenatal care is fully descriptive of the methods followed and may be obtained by writing to the association at 370 Seventh Avenue, New York City. It is of interest, however, to state here that for the period 1919-21 the stillbirth rate of cases cared for by maternity centers was 34.7 per cent, and for New York City as a whole 46.5 per cent for the same time. During the same period the death rate of babies during the first month of life in the cases cared for by this association was 25.9 per cent. The rate for the same period in New York City as a whole was 36.6 per cent. Out of 8743 expectant mothers supervised, there were 35 maternal deaths, giving a rate of 40.0 per cent as compared with the rates of 50.9 per cent for New York City, 67.2 per cent for New York State exclusive of New York City, and 80.0 per cent for the United States birth-registration area."

Similar results to the above are shown by the Bureau of Child Hygiene in New York City for the period 1914 to 1918, inclusive. During this time it was found that among

groups of women who had received prenatal care the deaths of babies under one month of age was 22 per cent as compared with the death rate for the same age and for the same period of time of 36.3 per cent for the city as a whole.

The methods of registering pregnant women in these centers are varied. When they are first started it may be necessary to canvass the districts in the city where congenital death rates are highest and to try, by personal persuasion, to induce the mothers to register at the maternity center. Expectant mothers may also be reached by reference from physicians, midwives, nurses, social workers, and various community organizations. It has been found that when proper prenatal work is once established in any community, the women register themselves voluntarily. It is not so easy to get expectant mothers to place themselves under supervision as it is to induce them to bring their babies to the health stations, but wherever prenatal work has been established it has been found that later there has been little or no difficulty in reaching the expectant mothers and inducing them to accept and follow the advice given.

Full accounts of the details of the organization of maternity centers may be obtained from those associations that are now carrying on this work and from practically all of the state health departments. Briefly, maternity-center service should cover the following:

The Station.—This should include a waiting room, examining room for the use of the doctor, and a dressing room for the patients. The waiting room should be as attractive and comfortable as possible and should not have the appearance of a clinic. In the waiting room there may be an exhibit showing the necessary articles to be prepared by the mother for her own use, and the baby's layette. Other exhibits will readily suggest themselves. Attractive posters indicating proper prenatal care are of great value. The examining room for use by the doctor, and the dressing room for the patients, are self-explanatory.

The Methods.—The doctor should hold a clinic at the

center at least once a week. Two mornings or two afternoons a week are preferable. The nurse should be on duty at the center certain hours each day, and always when the doctor is present. A record card for every expectant mother should be kept on file in the center, and everything concerned with her health should be entered on this card at regular intervals. The number of times that the expectant mother should see the doctor and have an examination may vary, but such visits should be not less often than once every month for the first seven months and every two weeks for the last two months of pregnancy. The nurse attached to the maternity center should assist the doctor in examining the women, interview the expectant mothers when the doctor is not present, giving them necessary advice about their individual problems and general health care, and visit them at their homes as often as may be necessary to see that they are carrying out the suggestions given and that the conditions in their homes are adjusted to meet their needs.

Types of Patients Usually Met With.

(a) Those who have made no arrangement for care at the time of delivery;

(b) those under the care of private physicians;

(c) those under the care of midwives;

(d) those who have registered at hospitals for care at time of delivery.

The maternity center must work in full co-operation with the local physicians. The latter group should be canvassed and told just what facilities the maternity center has to offer and that the latter will co-operate in every way with the doctor in keeping his patients under supervision during the prenatal period, reporting to him at regular intervals and referring his patients back to him for their confinement. The same routine should be followed with regard to midwives. If the midwives in the community are duly licensed and allowed to practice, they must be treated in an ethical manner. The same type of co-operation should be asked from them as that obtained from the physicians. It is interesting

to note in this connection that in New York City they have become warm and vigorous supporters of the value of prenatal supervision, and that the prenatal work carried on by the city Department of Health is directed almost entirely to the care of expectant mothers who have been referred for such care by the midwives of the city.

If the expectant mother has registered at a hospital for her delivery, the same type of co-operation should be extended to the hospital. If the expectant mother has made no arrangement for the time of delivery, the maternity center should refer her to a private physician, if she can afford to pay a fee; if not, arrangements should be made for her reception in a hospital for her confinement.

Every expectant mother under the care of the maternity center should be visited in her home every two weeks, up to the seventh month, and then once a week. At these visits the nurse should ascertain whether or not the expectant mother is following the proper methods of hygienic care, with particular reference to food, exercise, bathing, fresh air, rest, and freedom from worry. At each visit she should obtain a sample of urine for urinalysis and find out whether or not the expectant mother has any physical symptoms that need attention. She should leave at the home her own telephone number and a self-addressed postal card, telling the patient to summon her at once if any abnormal conditions should develop. In such case the private physician attending the woman, or the physician on duty at the center, should be notified at once. The nurse should show the expectant mothers how to prepare the necessary supplies for their confinement, and give advice regarding the clothing they should wear during pregnancy and at the time of the birth of the baby. The expectant mother should also be shown how to make the baby's layette, and the nurse should tell her what other articles will be needed for the proper care of the baby and how they may be made or procured. All of the preparations for the confinement, if it is

to occur at home, should be under the supervision of the nurse.

Other Types of Prenatal Care.—If it is not considered wise to establish a maternity center, prenatal care may well be carried on from the baby health center, if there be one, or, if not, through the visiting or district nurse. In such cases patients should be referred to their own physicians for any examinations or medical care necessary, and placed under the supervision of the doctor at the baby health center only when the care of a private physician cannot be obtained.

Pamphlets on prenatal care are of great value in rural communities. Such pamphlets are issued by the Children's Bureau at Washington and by many of the state departments of health. Printed letters on prenatal care are also of great value and are distributed by many of the state departments of health. These letters are usually nine in number and are sent out—one each month—to every expectant mother who requests them. They contain necessary advice, suggestions, and reassurances appropriate to the different months, and should also cover every type of personal hygiene and care that the expectant mother should give herself.

Proper prenatal supervision and care during pregnancy will reduce the death rate of mothers from many of the diseases occurring as a complication of pregnancy or childbirth and will assure the mother better health after the baby is born. While this reduction in the death rate of mothers might well be considered sufficient reason for the establishment of prenatal work in every community, the most evident effect of this work is found in the reduction of the baby death rate during the first month of life.

A further good result that comes from prenatal work is having the mother under supervision when the baby is born, thus assuring the proper kind of care for the baby, and the opportunity of having the baby breast fed from the time of birth. It is possible also to keep the child under continuous observation from the time of birth until it

enters school, for it should be part of the duties of prenatal nursing to keep the mother and baby under supervision for the first month of the baby's life, then to refer both to the nearest baby health station or to the district visiting nurse. The value of this continuous oversight cannot be overestimated. Indeed, such continuous and intensive supervision of both mother and baby must inevitably result in good health for them both.

Stillbirths.—We have yet no accepted definition as to what constitutes a stillbirth. There are, however, legal and medical definitions which may be quoted. *Medical definition of stillbirth:* The birth of the product of human conception which does not have life when entirely separated from the mother's body. *Legal definition of stillbirth:* The birth of the product of human conception which does not have life when entirely separated from the mother's body, but which has reached such a period of utero-gestation that, had it been born alive, it would have lived.

From the point of view of public health the definition of the American Public Health Association is of interest: "For registration purposes, stillbirths should include all children born who did not live any time whatsoever, no matter how briefly, after birth."

Importance of Stillbirths.—While stillbirths, as they are at present regarded, do not have any apparent influence on the infant mortality rates, it must be remembered that this loss of life before birth materially reduces the number of living births, and therefore they should be considered as infant deaths. If the stillbirth rate were added to the infant mortality rate, we would probably feel a greater sense of responsibility toward these babies who are born dead than we do at the present time.

Extent of Stillbirths.—The number of stillbirths in the birth-registration area amount to about 100,000 annually. This must necessarily be an estimate, as even in the birth-registration area the statistics regarding stillbirths cannot be considered accurate. Stillbirths are as important as deaths

of children who are born alive. Stillbirths as a cause of death in infancy exceed numerically the deaths from tuberculosis and the total number of deaths from all of the infectious diseases combined, except influenza and pneumonia.

The fact that a large proportion of stillbirths are not reported makes it exceedingly difficult for us to estimate the exact number that occur. Wherever it has been possible, however, to get statistics that have a reasonable degree of accuracy, we have learned that about one out of every twenty pregnancies results in a stillbirth. Based upon the living births, the stillbirth rate is about 5 per cent. In England it has been estimated, on the basis of careful statistical data, that there are four premature deaths, including miscarriages and abortions, the latter occurring before the fifth month of intrauterine life, for each stillbirth, which is considered as a death occurring after the fifth month of intrauterine life. If this is so, and the data seem dependable, we must be more than ever impressed with this enormous waste of life before birth.

Causes of Stillbirths.—It is not within the scope of this work to discuss all of the causes of stillbirths. These include the external causes affecting the mother, such as falls, accidents, fright, injury, shock, or induced labor, or those causes which relate to the condition of the expectant mother's health, such as debility, malnutrition, fatigue, overwork, severe illness, or syphilis.

A few causes of stillbirths are dependent upon factors relating to the child itself. These mainly concern an abnormal development of the child before birth and need not be considered in any discussion of the question of prevention of stillbirths as a whole.

Syphilis as a Cause of Stillbirths.—In England estimates have been made that from 33 per cent to 44 per cent of the still births are due to syphilis. Professor Whitridge Williams, of Johns Hopkins University, states that in a series of many thousands of stillbirths occurring in patients admitted to that hospital, it was found that 40 per cent were

caused by venereal disease in the mother. The significance of this condition cannot be ignored. Proper blood tests during the early part of pregnancy in every expectant mother would determine whether or not syphilis was present and would allow for early and proper treatment. If this were done, it is probable that a large proportion of these stillbirths could be prevented and that children born of such infected parents would not themselves be infected with the disease.

Prevention of the occurrence of stillbirths lies in the extension of facilities for proper prenatal care and better obstetrics.

Diarrhœal Diseases.—This group, which stands second as a cause of death of babies, has been the one that has received the most attention. The earliest type of baby-saving work was directed almost wholly to reducing the rate from stomach and intestinal disorders. These diseases are the ones that have made mothers consider the heated time of the year as a particular menace, but as they have been the most prevalent of the diseases of infants, so they have been also the most easily controlled.

Methods for the reduction of the death rate from diarrhœal diseases, may almost be summed up in the term "universal breast feeding." We cannot discount the general hygiene of babyhood, for universal breast feeding is far from having been achieved, therefore any program to reduce the death rate from diarrhœal diseases must include the proper adjustment of everything that makes for proper sanitation of the baby's home and for the personal hygiene of the baby. Pure milk, cleanliness, fresh air and regular habits in the home, added to the proper hygiene of baby life, will have a great contributory influence in lessening the occurrence of stomach and bowel disorders.

There has been and still is a tendency to overexaggerate the importance of milk in its relation to the reduction of the baby death rate from diarrhœal diseases. Again we must emphasize the fact that if they baby is bottle fed, the

milk must be absolutely safe and pure. On the other hand, the safest milk supply in the world, used under the best conditions, will not alone reduce the baby death rate.

Some years ago the Bureau of Child Hygiene of the New York City Department of Health made a study covering about 4,000 *living* children between three and four months of age to find out the method of feeding followed. It was found that 79 per cent of the babies were breast fed exclusively, 13 per cent were fed on bottle milk exclusively, and 8 per cent on breast milk and bottle milk combined. A similar study was made in 1,065 cases to determine the relation of the character of feeding to deaths occurring from diarrhœal diseases in infancy, and it was found that out of the total of 1,065 infant *deaths* from diarrhœal diseases, 16.7 per cent of the babies were breast fed exclusively, 22.7 per cent were fed on cow's milk and breast milk combined, while 60.6 per cent were exclusively artificially fed. Summing this up more closely, we find that 17 per cent of the babies that died were exclusively breast fed and 83 per cent were artificially fed in whole or in part. Other investigations made by the same bureau gave similar results, and a long series of studies showed that approximately 90 per cent of the babies who die from diarrhœal diseases are artificially fed while 10 per cent of these deaths occur in infants who have been exclusively breast fed. These figures are directly reversed, as far as feeding is concerned, by the record of babies who were alive at the end of their first year. Here numerous studies showed that of the babies who did survive through the first year, approximately 90 per cent were breast fed, at least up to six months of age, and 10 per cent bottle fed.

From these conclusions we may draw two important inferences. The first is that universal breast feeding would reduce the death rate of babies from diarrhœal diseases to a minimum. The second is that our main efforts at present to reduce the death rate from this cause must be directed toward that group of infants who are artificially fed, and

toward insuring breast feeding for every infant at least up to six months of age.

The figures that we have quoted above, with reference to mortality rates, from diarrhœal diseases in infants who are breast fed and those who are artificially fed, are borne out by statistics gleaned by others. Tyson states that "of 150,000 infantile deaths in Great Britain, 75 per cent were in those who were artificially fed." Kober states that "of 54,047 infant deaths investigated at home and abroad with reference to feeding, 86 per cent were artificially fed. In Munich the mortality in breast-fed babies is stated to be 15 per cent, while in bottle-fed infants it is 85 per cent." Newsholme gives almost the same figures for England and states that "10 per cent of the infant deaths from diarrhœal diseases occurring in that country are those in breast-fed infants and 90 per cent in bottle-fed infants."

Respiratory and Contagious Diseases.—Deaths from respiratory diseases in infants are usually due to broncho-pneumonias occurring as sequellæ of some one of the contagious diseases, usually whooping cough or measles. There can be no question that the occurrence of both the contagious and respiratory diseases are influenced by the opportunities for the existence of, and easy spread of, infection in those types of dwellings where overcrowding, close personal contact, and lack of ventilation are evident. These conditions are serious enough for adults, but there are few babies who have sufficient power of resistance to withstand them at all.

Some years ago the Chicago Department of Health published a striking graph, which it called "giving the babies the double cross." It showed that, whereas the baby death rate from diarrhœal diseases was very low during the winter months and rose to a high point during July and August, only to fall again as the cool weather approached, the baby death rate from respiratory and contagious diseases showed just the opposite reaction. That is, it was very low during the summer, began to rise during the fall months,

and reached its height some time during the winter, and then slowly fell again during July and August. The points where these lines crossed—the diarrhœal diseases going up and the respiratory diseases going down, or the reverse—usually occurred in May and October. These two crossing points led to the naming of the graph.

This sharp rise in the baby death rate during the summer has become almost a thing of the past, and certainly no self-respecting community would expect at the present time to have its summer baby death rate any higher than that which occurs in winter. But where intensive public-health work for the reduction of the baby death rate from diarrhœal diseases has been carried on we find a marked reduction in the death rate during the summer months, although little or no decrease has occurred in the respiratory death rate during the late fall, winter, and early spring. The significant thing, from the point of view of the public-health worker, is that this increase from respiratory and contagious diseases follows almost exactly the occurrence of cooler weather and the consequent habit of indoor living. One might almost call it the curse of the closed window.

In a later chapter the definite relation between ventilation and the occurrence of respiratory diseases among school children will be discussed. The relation of lack of ventilation to the incidence of respiratory and contagious diseases in babies is even more marked than it is in later childhood. There is no reason why contagious and respiratory diseases should occur more frequently in winter than they do in summer, as far as the presence and habits of the bacteria causing these diseases are concerned. We know that sunshine and fresh air are the best germicides we have, and that, given a full amount of each, we need have little concern with the bacteria of disease. If, however, we live in places that have no ventilation and no possibility of sunlight, we are providing disease bacteria with the most favorable conditions for their development. Close, overcrowded rooms

are the one thing necessary to increase the incidence of contagious and respiratory diseases.

Baby Health Stations.

Definition.—The term "baby health stations" is used to include the types of organizations which have been and are variously known as "infant welfare centers," "infants' milk stations," "baby health centers," and other similar designations.

History.—The earliest known type of baby health station was founded in France and was known as the *Consultation de Nourrissons.* This was organized in the year 1890, when Professor Herrgott founded *L'Œuvre de la Maternité* at Nancy. The infants who were born in the latter institution were, under its rules, required to be brought by their mothers for a medical examination when they were one month old. If the child's progress had been satisfactory, the mother received a gift of money. The work of this consultation was, therefore, mainly one of health care and early physical examination, but it did not include the provision of any food supply for the artificially fed infant. In 1892 Professor Budin established at the *Charité Hospital* in Paris a similar consultation. Doctor Budin also established similar institutions at the *Maternité Hospital* in 1895 and at the *Clinique d'Accouchement Tarnier.* These were attached to the maternity hospital, and only children born in the hospital were allowed to attend them. All of these babies were kept under observation and medical care during the first two years of their lives. Breast feeding was encouraged, but when found impracticable the children were given sterilized milk which was furnished by the hospital. The children were examined and weighed once each week.

The second type of baby health station, and the one upon which practically all similar organizations in this country have been founded, was the *Goutte de Lait.* This was practically a milk dispensary. While in the *Consultation de Nourrissons* the majority of infants are breast fed, the opposite is true in the *Goutte de Lait.* Here the greater num-

ber of babies are bottle fed. The first *goutte de lait* was established by Doctor Veriot in connection with the Belleville Dispensary in Paris. He did not, however, give them this name. That was suggested by Dr. Leon Dufour, who established an institution of this kind in Fécamp in 1894.

The first infants' milk station in the United States was established by Nathan Straus in New York City in 1893. The Straus station placed emphasis upon the value of pasteurized milk and furnished to each infant in attendance milk modified to suit the age of the baby. This was placed in individual feeding bottles, and a sufficient supply of these bottles for each day's feeding was given out each morning.

By 1910 there were in the United States forty-two organizations maintaining some type of baby health station. These were situated in thirty different cities.

The general tendency to change the names of these centers from a designation which features milk such as "infants' milk stations," to the type of name which features the health idea, such as "baby health stations," "baby clinics," and the like, is indicative of the change that has taken place in methods of organization. The early type of infants' milk station did not feature the educational side. These stations dispensed milk in quart bottles, or milk modified at a central laboratory, and dispensed in individual feeding bottles, modification being made to suit the different ages. Physicians and nurses were rarely in attendance at these stations, though occasionally physicians were employed to look out for sick children. Later, the idea of prevention of illness in babyhood was more or less accentuated, but the distribution of modified milk continued. The sharp change in policy was apparent about 1905. It seems impossible to set an exact date or to award any recognition of priority to any city or group of stations for the establishment of preventive health measures as the predominant feature of the baby health stations. This change took place between 1905 and 1910. It received early recognition on a large scale in Boston, Cleveland, Detroit, Indianapolis, Louisville, New York,

Providence, Rochester, and Washington. Numerous small communities were making a beginning in this regard, but the places mentioned were the only ones in which a definite attempt was made to include in the functions of the baby health stations education of the mother in methods of proper hygiene and baby feeding. All of the stations mentioned were maintained by private subscriptions and carried on under the auspices of private organizations. In New York City the first strictly municipal stations were organized in 1911 under the jurisdiction of the Department of Health, and the full cost of the work was borne by the municipality.

The educational type of baby health station emphasizes the value of breast feeding. The tendency has been to discard stated feeding formulæ for different ages and to place the emphasis on education of the mother and the importance of keeping the baby well. Whole milk is usually distributed in quart bottles. Each baby is examined by the physician in attendance, and if bottle feeding is necessary, an individual formula is prescribed in each case. The mother is taught by the nurse in each station how to modify the milk in accordance with this formula. If necessary, the nurse makes visits to the mother's home to see that her instructions in this regard are carried out and that all other methods of baby hygiene are being followed.

To-day, all baby health stations accentuate the idea of the prevention of disease. The popular slogans are, "Keep the baby well," and, "Prevention, not cure, of disease." The distribution of milk is now considered to be of minor importance and in the near future it may well be eliminated entirely. Milk that is safe for infant feeding can now be procured in many communities. Its distribution by the baby health stations has only two points of value: first, the knowledge that the mother is obtaining it regularly, and second, it serves as an incentive for the mother to visit the station regularly, and so keeps her and the baby in constant contact with the station régime.

There are three recognized types of baby health stations:

(a) stations for dispensing milk already modified according to formulæ suited to different ages. This milk is given out in individual feeding bottles, sufficient for a day's supply. Stations of this type may or may not provide for any medical or nursing care or health instruction to the mother;

(b) stations which provide health instruction for the mother and health care and supervision for the baby, but do not dispense milk;

(c) stations that dispense whole milk, have a medical and nursing service for health education of mothers and care of the babies, including individual feeding formulæ for all artificially fed babies.

As the education of the mother in methods of proper baby care and feeding is the most effective method of keeping babies well, the majority of the baby health stations at the present time are the types noted under (b) and (c).

Purpose of Baby Health Stations.—The program for the proper conduct of baby-health-station service should meet the following needs:

(a) supervision of expectant mothers during pregnancy, confinement, and until after the baby is one month old;

(b) education of mothers in all methods of baby hygiene and feeding;

(c) prevention of occurrence of any disease and maintenance of sound health for all babies;

(d) maintenance of breast feeding from time of birth;

(e) when breast feeding is impossible, provision of a supply of safe and pure milk;

(f) proper facilities for the continued health care of children of preschool age;

(g) the use of all community facilites that may be helpful in the reduction of the baby death rate or promotion of health during babyhood;

(h) organization of Little Mothers leagues;

(i) promotion and use of all community factors which in any way will decrease the infant sickness or death rate;

(j) to act as a center for the dissemination of information regarding health and health habits and for the promotion of the health of all people in the community.

Organization.—Baby health stations should be situated in the sections of a community where the baby death rate is highest. An ideal arrangement is to have three rooms; the first to be used for the dispensing of milk and as a waiting room for the mothers and babies; the second, a room where the nurse may keep her equipment and where the babies may be undressed and weighed; the third, for the use of the doctor.

The waiting and dispensing room needs little furniture other than the refrigerator and dispensing table, and benches and chairs. The nurse's room should be equipped with a table to hold the utensils for demonstrating the modification of the milk, a small desk or table, a supply closet or shelves, and the equipment to be used for demonstration purposes. This may include an infants' bath tub made of tin or enamel, a two-burner hot plate, a two-quart double boiler, a two-quart saucepan, teakettle, dishpan, strainer, bowl, funnel, pitcher, measuring glass, feeding bottles, nipples, and three or four covered glass jars to hold cotton, boric-acid solution, and soap. A similar covered glass jar for keeping the nipples in a boric-acid or borax solution will be found useful. Across one side of this room there should be a folding shelf three feet wide and attached to the wall by hinges at about a height of three feet from the floor. Such a shelf may be easily installed and should have folding legs or some form of support attached to the front edge. When not in use this shelf may be either pushed up flat against the wall or let down until the lower edge rests upon the floor. When in position it is to be used as a table upon which to place the babies when they are being undressed or dressed.

The doctor's office needs a desk or table, chairs, and a filing cabinet for the record cards. Various other articles will suggest themselves, but it is better to keep the equipment as simple as possible. This is particularly true with

regard to the utensils and equipment that are used for demonstration purposes. Everything of this kind should be so simple that the mother may be able to duplicate them for her own use in her home. It is detrimental to make any of the equipment too expensive or to have too much of it. Mothers are easily frightened by what seems to them to be a profusion of articles. As a general rule, it is possible to find in almost any family the few dishes that are necessary in the modification of the milk for the baby, but when these must be supplemented they must be of the cheapest kind and always simple and few in number. Such an outfit for use in the home need consist only of a double boiler, pitcher, measuring glass, funnel, bottles and nipples, bottle cleaner, and the glass jars for holding the nipples and a borax or boric-acid solution.

The health centers should be open at stated hours, preferably in the morning. The doctor should be present at the station once or twice a week on regular days and at stated times. On the other days the nurse should be present for the purpose of giving whatever advice the mother's may need in the intervals between the doctor's visits.

If milk is to be dispensed it should be received at the station at an early hour each morning, placed at once in the refrigerator, and kept properly iced until it is given to the mothers. It has been found that the dispensing of milk in one-quart bottles is best. Such milk should be sold at as nearly cost price as possible and must, of course, always be of the best quality and absolutely safe for use in infant feeding. With the general improvement in the supply of milk for the whole community, the selling of milk at the centers may not be necessary. It has been found, though, that the dispensing of milk at the centers has had a certain advertising value and that many mothers of bottle-fed infants will bring their babies regularly to the stations because they cannot obtain the proper milk at the same price at any other place.

When there is any question whatever as to the safety or purity of the milk supply, the dispensing of safe milk at

the centers is essential. Care must be taken, however, not to emphasize bottle feeding. The keynote of the baby health stations should be *education.* Making bottle feeding easy is not the way to reduce the baby death rate or to keep babies well. The whole emphasis must be placed upon breast feeding, and bottle feeding advised only in those cases where breast feeding is absolutely impossible. Systematic and regular efforts should be made to induce the mothers to nurse their own babies and to bring them regularly to the station for the necessary supervision and health care.

Universal breast feeding of babies is possible. At the present time probably 95 per cent of all mothers are able to nurse their babies during the first six months. The late Dr. J. P. Sedgwick of Minneapolis carried on for many years in that city an extensive scheme of education of mothers as to the importance of breast feeding, and he originated a simple method of increasing the flow of breast milk and causing the breasts to function again in this way, even though the milk had been absent for a definite period of time.

Doctor's Sedgwick's theory was based upon the idea that, in order to stimulate the flow of breast milk, the breasts must be completely emptied at each feeding. In instances where the supply of breast milk is small or entirely lacking, the baby is nursed at regular intervals and weighed both before and after the nursing period, in order to determine the amount of milk he has been able to obtain from the breast. Supplementary feedings are given after the breast feeding is completed, in order to assure the baby a sufficient supply of food. After the infant has obtained all of the milk possible from the breast, the latter is thoroughly milked by grasping the nipple slightly behind the areola, using the thumb above the nipple and the first two fingers below. The milking motion is the same as that used in milking a cow. Usually, in the beginning, little or no milk is obtained from the breast by this process, but in a short time, ranging from two days to two or more weeks, if the baby is nursed regu-

larly at the breast and the milking carried on immediately afterward, there will be noticed an increase in the supply of breast milk, and in nearly all cases it has been possible to increase the supply of milk to normal and thus make full breast feeding possible.

The mother should be instructed, at the center, by the doctor and nurse as to all the essentials of proper baby hygiene and feeding and care. Babies should be weighed at least once a week and should be examined by the doctor at least once every two weeks, and more frequently in the case of delicate infants. The purpose of the baby health center is to *prevent* illness, therefore sick babies should not be treated unless the illness is caused by some error of diet. If artificial feeding is necessary, an individual formula for the baby should be prescribed in each case. One copy of the formula should be given to the nurse and the second to the mother. The nurse should demonstrate at the center the proper modification of the milk, and should thereafter make as many home visits as may be necessary to see that the mother is following the instructions given.

The simplest forms of modification have been found to be most effective. Dilution of whole milk with plain water and the addition of the requisite amount of sugar are advisable and will be found suitable for nearly all babies. The difficult feeding cases must have individual attention and if the formula in such cases is at all intricate, it may be prepared at the center and dispensed to the mother in individual feeding bottles. As a general rule, however, dispensing whole milk and teaching the mother how to modify it for her baby has a distinct educational value, and at the same time greatly reduces the cost of the maintenance of the center and the possible cost to the mother.

The baby health station may be maintained under this name, or as part of a "children's health center" or "general health center." In any case, its facilities should be available for all mothers. As the work carried on by these centers should be entirely preventive in character and have

for its purpose the education of parents in the proper methods of keeping babies well, there need be no question of infringement on the rights of the medical profession, and doctors should be encouraged to send their patients to the station for whatever health supervision is needed. The strictest standards of ethics must be maintained and all sick babies should be referred to their own physicians or, if their parents are too poor to pay for private medical care, they should be referred to hospitals or dispensaries.

Results of the Work of the Baby Health Stations.—Owing to the unsatisfactory nature of most of the statistics furnished by the baby health stations of the country, it is a practical impossibility to do more than estimate the actual reduction in the baby death rate which may be credited to the work of these stations. As a general rule, in various cities and towns, the statistics report that the death rate among babies in attendance ranged from 1 per cent to 3 per cent. These figures are undoubtedly incorrect, owing to the fact that when babies are ill and cease to attend the station, their names may be taken from the office record.

Many stations have established a standard for following up all sick babies, so that the death of any baby who has been at any time registered at the baby health station may be recorded and taken into account in any statistical data. A comprehensive study of the infant mortality in New York City for the year 1915 was made by Ernst Christopher Meyer, Ph.D., of the International Health Board of Rockefeller Institute. Doctor Meyer studied baby health stations maintained by different oganizations in New York City.

In order to obtain as accurate a statement as possible of the number of deaths occurring among babies in attendance, Doctor Meyer devised a system of computing the total number of days' attendance at the station, dividing this by 365 (the number of days in a year) and then computing the death rate for the year on the basis of the so-called "infant days." As the average duration of attendance at these stations was about four months, it may be seen that each 365

days of "infant attendance" used represented the combined attendance of three babies. Notwithstanding the enormous handicap employed in this method of computation, it was found that the baby death rate computed on "infant years" was 42 per 1,000 among babies registered at the stations in New York City, whereas the total death rate for the city as a whole for that year was 93. It is probable that such a result is duplicated in practically every baby health station in the country. It is also probable that if accurate statistics could be obtained, based upon the actual number of babies in attendance rather than upon the number of days they have been in attendance, the death rate among these babies could be shown to be far lower than the figures given by Doctor Meyer. However, even if we accept this method of computing the death rate of babies attending the baby health stations, we have a sufficient justification for these stations. Any method that cuts the baby death rate in half is worth all the time and money and personal effort that may be expended upon it.

Personnel and Cost of Maintenance of Baby Health Stations.—These will necessarily vary in different communities and in accordance with the available financial support. An ordinary budget for such a station must cover the items of rent, heat, light, the original cost of equipment, repairs, and replacements, incidental cost of maintenance, and the salaries of the staff.

Rent is a variable factor. Often premises may be obtained free of charge. If it is necessary to economize on this item, an acceptable station may be conducted in one large room, using screens to separate the dispensing and waiting room from the doctor's and nurse's office. It is, of course, obvious that no fixed amount can be given as the cost of *equipment.* This may be made as simple as possible and as cheap or as expensive as the finances will allow. For the reasons stated before it is wise to keep the equipment of the simplest possible character. Everything must be of good quality, so that frequent replacements may not be necessary. White

enamel furniture is desirable, if the original cost is not too high, but ordinary pine tables and chairs, and other furniture, may be painted white and will be found suitable and satisfactory. *Salaries.*—While it is frequently possible to obtain the volunteer services of a physician for the baby health station, such a method is not recommended. The doctor should receive a salary and should consider the time spent on duty at the station as a regular part of his practice. Salaries of physicians for this service may range from $500 a year for two mornings a week attendance to $1,800 for one-half time or attendance every morning during the week. Nurses' salaries vary, ranging from $1,200 to $1,800 when assigned exclusively to work in the station, but if the nurse is engaged in other forms of public-health nursing, a proportionate amount of her salary may be charged against the budget of the station. If large numbers of babies are to be cared for, it is probable that a nurse's assistant will be needed. Such positions should be open to intelligent young women who have not necessarily had any nursing experience, but who can be taught to assist the nurse in her duties. A woman who will dispense the milk, act as matron, and do the necessary cleaning of the station may also be employed. The salaries of the nurse's assistant and matron usually range from $600 to $900 a year for part-time employment.

Unit costs of baby health stations are not generally available. In communities where they have been worked out, however, it has been found that baby-health-station work can be carried on at a cost varying from sixty cents to $1.50 per month for each baby cared for. Incidentally it may be stated that every community maintaining a baby health station should know the exact cost of carrying on this work and the exact cost of caring for each baby. Not only is this necessary from the point of view of proper economy, but such knowledge will be found very useful in any appeal that may need to be made for the necessary financial support of the station. Many people will contribute $12 to care for a baby at the station for one year when they would not give a

similar amount in answer to a vague appeal for the support of the station.

Value of Baby Health Station Work.—There are one or two points that must be considered in an effective evaluation of the results that may be expected from baby-health-station work. First, we should consider that as the purpose of the baby health station is to prevent illness, its true success in this direction can come only if the babies are reached at an early age. We have seen that over 40 per cent of the infant mortality occurs during the first month of life, and over 50 per cent during the first three months of life. If, therefore, babies are registered at the station after the age of three months, it is evident that no large impression can be made upon the death rate under one year of age. Statistics issued by various baby health stations show that the largest numbers of babies are enrolled at the age period from four to eight months. This probably holds true in the great majority of the stations. It is obvious that this late enrollment not only prevents the station from achieving any perceptible reduction in the baby death rate under three months of age, but also, to a very large extent, inhibits any effort that may be made toward universal breast feeding. Every effort should be made to induce mothers to enroll their babies at the station as soon as possible after birth. This early enrollment may be achieved in several ways:

(a) through co-operation with the local registrar of births. A copy of the birth certificate and a letter telling the mother of the necessity for proper baby care and urging her to enroll at the baby health station, if other medical supervision is unavailable, should be mailed to the mother of every new-born baby as soon as the record of birth is received at the registrar's office;

(b) house-to-house canvass may be made in those parts of the community where the baby death rate is highest, for the purpose of inducing mothers to enroll their babies at the baby health station at the earliest possible moment;

(c) extension of prenatal care, with continued supervi-

sion of the baby from birth and its enrollment at the baby health station as early as possible in the first month of life;

(d) obtaining the co-operation of all social service and welfare agencies for the purpose of having them refer to the baby health station all babies who come under their observation, particularly those under three months of age;

(e) widespread publicity of the excessive mortality rates under three months of age, urging mothers to place their babies under proper health supervision as soon as possible after birth.

Home Visiting by Nurses.—As part of the duties of the nurse at the baby health station she should make visits to the homes of all mothers for the purpose of readjusting the baby's environment in the home and seeing that the mother follows out all of the methods of proper baby care and feeding. When establishment of a baby health station is not possible, such instruction should be given by the visiting nurse in every family where there is a young baby. Repeated and continued observation of these babies is essential during the first year of life. All district nurses should also co-operate with the local registrar of births so that they may obtain the necessary information to enable them to visit babies as soon after birth as possible. While the work of the visiting nurse has a lower unit cost than the work of a baby health station, it is generally less efficient. A nurse may supervise from fifty to two hundred babies enrolled at a station. If her work is confined entirely to home visits, it is probable that she cannot keep more than twenty to thirty babies under observation.

Milk.—It is not within the province of this book to discuss the whole question of the provision of a safe milk supply. Milk, however, does bear a definite relation to the health of children, and where breast feeding is impossible, the purity of the milk supply assumes first importance. The best substitute feeding for babies is milk obtained from healthy cows, who are kept under sanitary conditions, whose udders and teats are cleaned before milking and where the

milking is done by healthy persons, under the strictest standards of cleanliness, the milk being immediately received into sterile containers and kept covered and at a temperature below 50° F. until it is used by the consumer.

Practically all of the milk received in any community of any size is twenty-four hours old when it reaches the consumer. Milk may easily become contaminated. Bacteria may gain access to it through lack of precautions taken at the time of milking or through careless handling during the time that it is in transit or after it is received in the home. The contamination may be due to the types of bacteria which are harmful only when present in large quantities, or to what are known as specific bacteria, or those that cause certain definite diseases. Thus milk may be contaminated with bacteria which cause typhoid fever or those which are the cause of scarlet fever or septic sore throat. Not all bacteria in milk are harmful. It is probable that the usual types of bacteria that are found in milk do little harm to infants, provided they are not excessive in number. During the summer, however, when the infant's power of resistance is somewhat lowered on account of the excessively hot weather, these bacteria, even in limited numbers, may cause intestinal and stomach disorders.

Many studies have been made to show the relation of milk as a possible cause of disease in infancy. Among the best known of these is a study carried on some years ago by Dr. William H. Park, including 340 babies under six months of age, 265 from seven to twelve months, and 47 slightly over twelve months of age. The districts in which most of these babies lived were in the lower east side of Manhattan, New York City. For an extended account of this experiment reference is made to an article by Doctor Park in *Public Health and Hygiene,* edited by him. Observations were made on the feeding of these children, both in winter and in summer.

The following tables show in condensed form the results

obtained with the different foods employed in winter and in summer:

FOOD AND RESULTS—WINTER

	Did well	Did fairly	Did badly	Died	Totals
Store milk	47	6	2	.....	55
Condensed milk	39	5	2	2	48
Good bottled milk	51	13	1	3	68
Milk from central distributing stations	35	20	4	.....	59
Best bottled milk	5	.....	1	.....	6
Breast feeding	7	1	.....	1	9
Totals excluding cases counted twice	156	41	8	6	211

FOOD AND RESULTS—SUMMER

Store milk	21	23	20	15	79
Condensed milk	22	20	14	14	70
Good bottled milk	37	23	29	9	98
Milk from central distributing stations	84	33	24	4	145
Best bottled milk	9	3	.....	.....	12
Breast feeding	17	7	7	.....	31
Totals excluding cases counted twice	184	108	88	41	421

Reference to the relation between the death rate of artificial and breast-fed babies has already been made, and it has been shown that out of every ten infant deaths that occur, nine are those of bottle-fed babies and only one that of a breast-fed baby. While, therefore, my personal feeling is that the reduction of infant mortality is 80 per cent education and 20 per cent pure milk, nevertheless the 20 per

cent representing the effect of a supply of pure milk upon the infant death rate is so important that every effort should be made to see that the infant receives protection in this direction.

Pasteurization of Milk.—When the milk supply is of doubtful purity it should be pasteurized, either at a central station or in the home. Pasteurization consists in heating the milk to a temperature of 140 degrees F. and holding it at that temperature for at least twenty minutes. There is a great difference of opinion as to the merits and value of pasteurization. The common argument against general pasteurization of the milk supply is that a false sense of security will be given to the community as a result of following such a method; that if pasteurization is practiced the farmer or milk producer will feel that he need not take any particular precautions to insure the quality of the milk, and dirty and impure milk will be supplied with the idea that pasteurization will correct these conditions and prevent any harmful results from using the milk. It is a sad commentary on human nature that such an argument is used, and it seems impossible to believe that dairymen in general would produce dirty or contaminated milk, trusting to pasteurization to remedy their gross negligence. On the other hand, it is probably impossible for any community to be sure of the complete safety of any large supply of raw milk. Pasteurization will make all milk safer and eliminate the possibility of any contamination which may have occurred, notwithstanding the most stringent efforts to prevent it. Another argument that is brought forward is that pasteurization effects a chemical change in the milk supply and therefore renders it unfit for infant feeding. Practical experience on a large scale has shown that there is no force to this argument. Since the establishment of the baby health stations of the New York City Department of Health in 1911, from 30,000 to 60,000 babies have been enrolled at these stations each year. About 15,000 quarts of pasteurized milk are sold each day at these stations. In no instance

has there been any evidence of harmful effects to the child because of the pasteurization of the milk nor has there been any evidence that the vitamin content of the milk has been destroyed or altered to an appreciable extent.

Scurvy, a disease which has been supposed to result from the feeding of pasteurized or sterilized milk, is practically non-existent among baby-health-station babies. Not more than two or three cases, and those of an exceedingly mild type, have been found among the thousands of babies fed on pasteurized milk in the City of New York. If there should still remain a question as to any decrease in the amount of vitamines in the baby's food due to pasteurization of the milk, this deficiency can be easily made up by giving the baby orange juice or the strained juice of tomatoes. Another argument is that pasteurized milk spoils more rapidly than raw milk. Pasteurization does not destroy bacterial spores. It does destroy those bacteria which convert the sugar in the milk into an acid substance and cause souring. As a result, pasteurized milk does not really sour. Pasteurization does not harm the protein-attacking bacilli, and pasteurized milk, therefore, putrefies instead of sours. Pasteurization destroys any harmful bacteria that may be present in the milk, but pasteurized milk must be cared for as carefully as raw milk. It may become contaminated after pasteurization, just as raw milk may, and it should be kept in clean containers which are also kept covered, and all milk, both raw and pasteurized, should be kept continually at a temperature below 50° F. until it is used.

Little Mothers' Leagues.—Little Mothers' Leagues originated in the Bureau of Child Hygiene of the Department of Health of New York City. The purpose was to enlist the co-operation and interest of girls in the baby-saving campaign and at the same time to give to these little mothers who had to care for their younger brothers and sisters the information whereby such care might be made safe. The idea of the Little Mothers' Leagues spread with great rapidity and they are now to be found in practically every state in

the Union and in nearly all foreign countries. There can be no doubt that the economic and social conditions which make possible the "little mother" should be readjusted and every child should have the freedom that belongs by inherent right to childhood. Girls of this early age should not be burdened with the responsibility of caring for babies, but until the desired readjustment has been made we must face the fact that in our crowded cities and, to a slightly less extent, in many towns and rural communities, little girls often are required to assume almost the entire charge of one or more of the younger children in the family. It would seem possible to change the little mother from what John Spargo has called "a social menace" to an aid and ally. This may be done in such a way that the joy of childhood may be added to the little mother's life, and the care of the baby intrusted to her may be made safe and, at the same time, much less of a burden than it has been in the past. The spirit behind the Little Mothers' League, therefore, should be one of helping the little mother as well as helping the baby she is caring for.

The organization of these leagues varies in different communities, but their full purpose is not achieved unless the league provides recreation and pleasure for the little mother while at the same time it gives her the information she needs not only for the present care of the baby in her charge, but also for her own potential motherhood. Instruction of our girls in personal hygiene and in the care of babies should be made a regular part of our school curriculum. It seems strange that we educate our girls for almost every profession in the world except that of the almost universal one—motherhood. If ignorance is to be rated as one of the greatest causes of infant mortality, certainly the greater part of that ignorance can be eradicated in the true spirit of prevention by seeing that our girls are given the instruction they should have. As rapidly as possible this type of education should be included in the program of the sixth to eighth grades of elementary school life. But until this is done there

is definite need of some form of organization such as that comprised in the Little Mothers' League.

Children love to belong to any organization. The little mother has not complained of her life, although her acceptance of it makes it none the less regrettable that it must be so, but she responds immediately to the suggestion that she enlist in a general campaign for the saving of baby life and that she become more intelligent with regard to the best methods of baby care. Children are supremely willing to be helpful if they can be reached in the right way, and the leagues have opened the opportunity for the full expression of this spirit.

It is probable that the methods carried out in the Little Mothers' Leagues furnish the first recorded instance of what is now considered the most progressive form of health education. They embody what was, and to a certain extent still is, a new form of health teaching. Dr. Ernest B. Hoag and Dr. Lewis M. Terman, in their work entitled *Health Work in the Schools* comment on this method of health teaching in the leagues, as follows:

> This method interests the child tremendously and impresses the subject upon her mind more definitely than anything else could. . . It means that children teach other children in words of their own, an innovation in teaching which accounts for the wonderful and instant success which the movement met with as soon as it was introduced. This method may be easily adapted to classes in public schools, and to mixed classes as well as to girls alone. It seems rather remarkable that the most successful method ever devised for teaching useful health lessons to children of this age should have originated not in the public schools, but in a great city health department, which is not ordinarily looked upon as responsible for teaching of any sort. This is another illustration of the fact that some of the best methods of teaching originate outside of school systems, and is in line with the growing demand of to-day that teaching methods and lesson materials be in touch with the real life of the everyday world.

Purpose of the Little Mothers' Leagues.—The primary purpose of the Little Mothers' Leagues is to reduce infant sickness and death rates.

The second purpose is the education of girls for potential motherhood. The method of teaching used in the leagues is so direct and simple that it is possible to give girls as young as ten years of age the type of instruction in baby care that will afford a sufficient background to equip them for intelligent motherhood.

The third purpose of the leagues, which has particular application to our foreign-born population, is to have the girls carry into their own families the knowledge they have gained and indirectly help their own mothers to acquire it. This does not mean that we expect our little girls to teach their mothers the elements of baby care, but in many race groups the child is the only one of the family who speaks English or who interprets to the parents the essentials of our American life. Many mothers can be reached through their own children who cannot be reached in any other way, and the education of the little girls, with the resultant information they can bring home to their families, produces almost surely a stimulation of interest on the part of the mother and father, so that they seek the further information they need.

Organization of the Leagues.—The leagues may be organized in connection with the baby health stations and schools, or by private baby-saving associations. The children should be asked to enlist as volunteer aids in the baby-saving campaign. A formal pledge card, stating that she will do all that she can to save the lives of babies, should be given to each member to sign. After the organization has been completed, a formal certificate of membership should be given to each girl joining the league.

The actual organization should be based, as far as possible, on self-government. The members of the league should elect their own president, vice-president, treasurer, and secretary, and conduct all the regular business of the meetings. The station, school, or organization doctor and nurse may be made honorary president and vice-president. In

actual practice it has been found that the majority of these leagues are conducted by a nurse, but if a doctor is available it adds to the interest and value of the instruction to have him give a talk at occasional intervals.

At the organization meeting the doctor or nurse should speak on the general subject of the aim and object of the league and tell something about the causes of sickness and death in infancy and how these may be prevented. At each meeting of the league, after the regular order of business has been gone through, the nurse should speak from ten to fifteen minutes about some special topic of baby care and then give an actual demonstration of the methods to be followed. If the subject is "How the baby should be clothed," the baby should be dressed and undressed before the children and they should be required to do this themselves until they know how. In these demonstrations it has sometimes been found feasible to use real babies, but if that does not seem practicable a doll will be found to serve the purpose. Several lessons may be devoted to one topic, and no one subject should be discontinued until it is evident that each child has a perfectly clear-cut idea of how to do the thing required, not merely a theoretical knowledge of how and why it should be done.

Many state divisions of child hygiene have published pamphlets on Little Mothers' Leagues. The New York State Division of Maternity, Infancy, and Child Hygiene at Albany has a comprehensive pamphlet on this subject, and another on this subject has been issued by the Child Federation of Philadelphia.

Equipment Needed.—The equipment may be as simple or as elaborate as desired. It is possible to conduct a league with the few essential articles for baby care that may be obtained from almost any household. As the work of the league progresses the type of equipment and utensils necessary will be indicated. If any money can be spent on equipment the following list is suggested:

Large towel made of some material that can be washed.
Small clothes basket that can be padded and lined by the children and used as a crib or bassinet.
Small table covered with a piece of oilcloth.
Blanket and small sheets for the bed. These can be made by the children out of cheap material.
Small tin bathtub about 26 by 13 inches at the top and 10 inches deep.
Bath thermometer.
Cake of plain castile or Ivory soap.
Few pieces of cheesecloth to be used as washcloths.
Two soft towels. Pieces of old clean linen may be used.
Covered pail for soiled diapers.
Outfit of baby clothing.
Package of safety pins.
Tin or agate ware double boiler.
Half dozen nursing bottles, accurately marked, in ounces and half ounces.
A half dozen rubber nipples.
Aluminum funnel with end small enough to fit the mouth of the nursing bottles.
Two-quart china or agate pitcher.
Tablespoon.
Brush to be used in cleaning feeding bottles.

The general use of all these utensils may be explained at the first regular meeting and their subsequent use taken up in detail as they are needed at each lesson.

Methods of Teaching.—In order that the leagues may be filled with the spirit which inspired their inauguration and in order that the teaching may be so effective that the children will not forget what they have learned, they should be allowed, as far as possible, to teach one another. One of the most successful ways of working out this method of self-education has been through the use of health plays written and acted by the children. The only supervision they should receive is that the plays should be read by the doctor or nurse in order to see that the facts are correct. No attempt should be made to alter the wording or method of presentation. These plays may deal with any aspect of baby life. The children should all be encouraged to write

plays or essays on each lesson as it is presented and learned and the succeeding lesson or a special day may be set aside for the presentation of the play which, in the opinion of the nurse, is most suitable.

Anyone who has had anything to do with these leagues has been impressed with the extraordinary value of this type of health education. Children are able, by utilizing their own forms of expression, to place the subject matter in such form that it is far more readily understood by other children than if it is presented to them by an adult, using the phraseology and thought of the grown-up world. Space does not permit of a review of some of these plays, but their originality and value for teaching purposes are beyond question and always affords a striking evidence of the efficiency of this method of health teaching.

The further idea in this form of education is "teaching by doing." It is, of course, not new, but it is still true that the best way to impress upon the child's mind the things you wish him to remember is to have him work out his own form of illustration. Dramatization offers one of the finest methods of working out this idea that has ever been devised, and if the child has once put his creative ability to work in illustrating something that he knows and wishes to tell others, the best possible foundation has been laid for focusing that idea in the child's mind and in the minds of other children. The result of this type of education lasts throughout life and does not pass away when the school days are ended.

The development of the leagues has interested so many people, and their success has been so evident, that there are many publications that are helpful in extending the play idea. The Bureau of Child Hygiene of the Department of Health of New York City has published a selected list of books for little mothers. These books are not necessarily on the subject of baby care, but are selected because of their helpfulness on all health questions as well as because they afford a good list on general subjects which interest chil-

dren. The list includes not only books for little girls to read, themselves, but a list of picture books with simple text that may be read and shown to the little brothers and sisters. The National Association for Prevention of Tuberculosis has published a number of playlets that may be used by members of these leagues. In all over fifteen of these plays that are easily acted, and on all possible health topics, have been worked out in a highly interesting manner. The American Child Health Association has also published a book of health plays for children, as developed by the teachers and pupils of New York City. This book is particularly helpful, as it contains standard height and weight tables and many health suggestions. The plays are all capable of being produced by very young children, and all of them have a distinct health message. In addition to the health plays, the American Child Health Association publishes books and pamphlets illustrating its ideal of the healthy body. Lists of these, with prices, or the pamphlets themselves, will be sent upon request to the association.

One of the lessons we have learned is that children are not definitely interested in health for themselves because of the possibility of their being sick some day in the future. The best way in which they can be kept well and learn the way to healthful living both for themselves and others is to get them interested in health in a play spirit. By obtaining their co-operation in this way they will live their lives in a healthful manner quite as naturally as they eat or sleep or play.

List of Lessons for Little Mothers' Leagues.—The subjects that may be covered for meetings of the leagues may easily comprise everything that relates to proper sanitation and hygiene both of the community and of the individual. Advantage should be taken of this opportunity to teach personal hygiene, and methods of health education suggested by the American Child Health Association may be adapted for league use. The teaching should never be formal, but always simple, adapted to the child's needs and under-

standing, and presented in an interesting manner. Lesson talks on baby care should cover at least the following subjects:

(1) General talk on infant mortality, giving illustrations as to the number of babies who are dying in the particular community and the methods whereby baby lives may be saved.

(2) Importance of proper lighting and heating of the baby's room.

(3) Value of fresh air, both indoors and outdoors, and by day and by night.

(4) Importance of cleanliness.

(5) The baby's bed.

(6) How to hold, lift, and carry the baby.

(7) Sleep and quiet.

(8) Growth and development; weight and height at different ages.

(9) Development of the special senses, including sight and hearing. Muscular development. Standing; creeping; walking.

(10) Importance of gain in weight. Nutrition.

(11) Bathing the baby.

(12) Clothing, including description and making of proper layette.

(13) How the baby should be dressed.

(14) The baby's diapers—how to put them on and how to care for them.

(15) Breast feeding.

(16) The bottle-fed baby.

(17) Proper food for the bottle-fed baby.

(18) Milk—where it comes from and how to care for it.

(19) The baby's feeding during the second year.

(20) Bad habits—how to prevent or correct them.

(21) Contagious diseases. (This topic may be extended to cover many lectures.)

There are many books written in which the details of baby care are adequately described. Doctor Holt's book on

the care and feeding of infants is one of the best. The names of other books on this subject are given in the bibliography. The pamphlets issued by the Children's Bureau on Infant Care and Care of the Child of Preschool Age, as well as similar pamphlets issued by various state departments of health, can all be recommended for this purpose. It is assumed that the person in charge of the league will be a trained nurse or some one who is entirely familiar with the proper methods of baby and child care.

The results that have been achieved from the organization of these leagues cannot be statistically computed. That they have had an effect upon the reduction of baby sickness and death rates is amply proved by clinical evidence and by the practical experience of those communities in which the leagues have been organized. Even if no immediate results were brought about by the leagues, they would still be worth while in stimulating the extension of health education and education in the care of babies and young children as a needed part of our regular school curriculum. Possibly their greatest value is in preparing the girls of this age to be the wise mothers of the next generation. In any program for prevention of infant sickness and death and for the building up of sound health in our children, education of the mother must play a large part. To acquire this education during girlhood would seem to be the ideal method, and until we educate our girls for this great profession of motherhood we cannot feel that they are really educated in any true sense.

Mothers' Conferences.—As part of the scheme of health education, conferences of mothers have some value. It has been found, however, that the instruction of the individual mother regarding the care of her own baby is more definitely effective than addressing mothers in groups. When medical or nursing service is limited it may be necessary to use this method of health education. Mothers' clubs should be formed. Occasionally this can best be done by having the mothers' meetings at the schools as a part of the pro-

gram of the mothers-teachers association or the regular mothers' association connected with the school. Meetings should be held at definite intervals and the doctor or nurse should give practical talks on methods of baby care. A simple equipment should be furnished and demonstrations of baby hygiene carried out. Such lesson topics may well follow those that have been given before when considering the question of Little Mothers' Leagues.

Educational Literature.—Pamphlets on prenatal and baby care are issued by the United States Children's Bureau and by practically all of the state departments of health and by many of the city departments of health. A number of private or semi-private child-welfare organizations also issue literature of this type. As a general thing, pamphlets for use in rural communities, or where public-health service for child welfare is not extensive, should be detailed and comprehensive. In many instances the information contained in these pamphlets will be all that the mother has for her guidance. In cities or other places where the services of the visiting nurse are available, pamphlets for distribution should be general in their nature and give only broad instruction on baby care. In these instances the nurse will have the opportunity of giving individual instruction to each mother and instruction of this type is of far more value than any amount of printed material. As we have seen in our consideration of general public-health education and child hygiene, a great majority of the mothers cannot be reached by the printed word. In any event, such material must be considered as supplementary only to the more direct form of personal supervision.

Newspaper publicity of a general nature, relating to child hygiene, and the use of syndicate articles, or a regular column on baby care, will be found of value. Where a public-health nurse is employed, she may furnish a weekly report to the local newspaper of the work she has accomplished, and include in this report such information and

advice as may be helpful in instructing mothers in the best methods to be followed.

All literature concerning child health, as well as all advice given, should be constructive. Mortality rates or anything that may inspire fear or dread may well be omitted. "Do" should be more prominent than "don't." The mother should be taught how to take care of her baby and given the necessary instruction. It is of little value to continually tell her what she ought not to do. The best type of public-health education of mothers in the care either of infants or of older children is that which relates to their own particular problems, and here is where the visting nurse is of inestimable value. It is probable that the larger part of the success of the efforts to reduce the infant death rate and the death rate among older children, as well as for the prevention of all disease, has been due to the cumulative effect of the widespread education of the mothers in any community. When child-hygiene work was first started, the most common piece of advice that was given by the various organizations was, "Don't ask your neighbor; ask the nurse." To-day this advice holds true only in part, for in those communities maintaining health stations or visiting-nurse service it has been found that the advice of the neighbor is now seldom given as far as it concerns the details of baby care. It is given, however, to the extent of advising the mother to take her baby to the baby health station or to call upon the district nurse. Such advice has practically eliminated the need for canvassing the tenements in order to induce mothers to bring their babies to the stations, and it has served to disseminate information as to the need of proper baby care and the fundamental education of mothers as to its value.

The moving picture is one of the most valuable forms we have of promoting health education. Used as a part of the equipment of the healthmobile, pictures may be shown in most isolated communities. Films on baby care have been used by the United States Children's Bureau and many

state departments of health and can usually be obtained free of charge for use by child-hygiene organizations.

Baby Health Conferences.—Baby shows or baby health conferences have had a distinct value in the past in stimulating public interest and in obtaining the co-operation of the mothers in the proper care of their babies. In those communities where baby health work is well established, such baby-health contests are rarely held. Where such work has not been carried on to any extent, these contests or conferences will be found one of the easiest and most direct ways to rouse the public to the necessity of baby hygiene.

The first baby health conferences or contests were held under the direction of Dr. Lenna L. Meanes of Iowa. The idea spread rapidly, and it is impossible to give definite credit to any other person or any organization for the development of the methods followed. At first the baby contest consisted in asking mothers to bring their babies to a certain place where they might be weighed, measured, and examined. Specially prepared score cards were used and babies were given a definite rating on the scale of one hundred for perfect. To a great extent this is the type of baby health contest used at the present time. Prizes are usually awarded to the baby or babies showing the highest score, based on their physical condition. Pamphlets giving detailed directions as to how these baby health conferences may be organized are issued by the American Medical Association, the United States Children's Bureau, and other organizations.

The main benefit derived from the baby contest is its publicity value. It is doubtful if any contests conducted on the plan that has been outlined are of value in either stimulating the interest of the individual mother or in improving the health of the individual baby. The drawbacks of such contests are obvious. Unless properly conducted under the most favorable circumstances, the bringing together of so many babies has its aspects of danger. The possibility of the spread of infectious diseases has become a reality in

many instances. This danger, of course, can be obviated by having a definite appointment made for the examination of each baby. It has been found, too, that contests of this kind are detrimental in that they arouse great jealousy in the mothers whose babies were not in condition to win a prize. In many communities where it has been the practice to conduct these baby health shows, it has been found that the stations have suffered greatly as the result. For weeks or even months after the contests have been held mothers have accused the station doctors and nurses of unfairness, and in many instances have refused to bring their babies to the station for further care. Probably the feature that is most detrimental in the baby contest, however, is that when they are carried on with the idea of awarding prizes to the babies who show the highest degree of physical fitness, only those babies are entered who are thought to be in good physical condition. Thus the contest reaches a group of children who do not represent those who are most in need of attention. The delicate baby or the underdeveloped one is rarely entered in a contest of this kind, yet these are the babies whom it is most desirable to reach and whose mothers are most in need of instruction.

The type of baby contest or health conference that is most valuable from the educational and public-health point of view is what might be known as a "baby improvement contest." Mothers of all babies, no matter what the physical condition of the latter may be, are urged to register and have their babies examined. Each mother is given a statement, showing the score, based upon the physical condition of her baby. She is also given definite advice as to how the baby's health may be improved and its health rating or score increased. Such mothers and babies are kept under continued observation. At the end of a stated period, usually three months, the babies are again examined and "scored." Ratings are also given to the mothers, and the mother who has most definitely followed the doctor's and nurse's advice is given some type of award. The prizes that go to the

babies are based upon the extent of improvement in health that has been shown between the first and second examinations. In contests of this type the educational value is great. Moreover, there is the possibility of reaching the type of babies that most need attention, and the opportunity of improving the health of these subnormal babies and supplying to their mothers the information that is needed in order to assure proper care for the baby.

In connection with baby health conferences there is an opportunity to conduct exhibits featuring educational posters, the equipment that is needed for the care and feeding of the baby, model nurseries and baby health stations, the use of moving pictures to show films on health topics, and practical talks on baby care to be given by the doctors or nurses.

Baby Health Weeks.—The nation-wide baby-week campaign was held in 1916 under the auspices of the Women's Bureau of the General Federation of Women's Clubs. The first baby week was held in Chicago in 1914. The baby week usually included a program in which each day was given to some definite purpose, such as Baby Sunday, Father's Day, Exhibit Day, Birth-registration Day, Baby-parade Day, Baby-health-station Day, and Baby-contest Day. Included in the baby week were all kinds of demonstrations, competitions, parades, and pageants and other methods found effective in educating the community to the value of baby-saving. Pamphlets describing the methods of conducting baby week campaigns, child-hygiene conferences, and child-welfare weeks have been issued by the United States Children's Bureau.

The Children's Year Campaign.—The Children's Year was instigated by the Children's Bureau, beginning on April 6, 1918. Its purpose was to stimulate interest in all the states in a program for baby-saving. The work was carried on under a combined Children's Year Committee, and the Woman's National Council of Defense. A committee was organized in each state, having subcommittees in the various

counties. It has been estimated that about 17,000 of these committees were organized and that over eleven million women took some part in this work. All but two states participated in this campaign. One of the main features was the measuring and weighing of all children under five years of age. In many communities a complete physical examination of all preschool children was carried on, notably in New York City and in the State of California. New York made over 50,000 physical examinations of preschool children, and California made over 40,000. Statistics showing the results of this work have been published by the Children's Bureau. The appended height and weight tables of children from one to six years of age have been computed as a result of the records obtained during Children's Year. As a result of the Children's Year campaign an international congress was held in Washington in May, 1919, to discuss and formulate standards of child-welfare work. Eight regional congresses were held in connection with the national campaign, in the cities of Boston, Chicago, Cleveland, Denver, Minneapolis, New York, San Francisco, and Seattle.

Use of All Agencies Interested in Child Welfare.—If we consider the exceedingly complex nature of the causes of infant mortality, and, further, that the baby is exceedingly sensitive to all environmental conditions, we understand the value of using every possible method that may be available and useful in keeping the baby well. There are in practically every community one or more organizations which are devoting themselves to some practical phase of child welfare. These may include only in a general sense the health of children, but every child-hygiene organization and other social agency engaged in child-hygiene work should be informed as to the purposes of other organizations interested in the child, and should also have an intimate and detailed knowledge of all those things in a community which in any way relate to child health. A public-health nurse should know all of the regulations of the public-health department; she should be intelligent on tenement-house laws; she should

know the sanitary regulations governing the control of the milk and water supplies and the disposal of waste matters; she must know where to place the responsibility for clean streets and proper parks and playgrounds; she should be in touch with the organizations which have the legal right to protect the child from any cruelty; she must co-operate in matters pertaining to the child-welfare laws; in fact, she should be in intelligent touch with every organization in her community whose activities affect child life in any way, and above all she should take charge of and work with the opportunities that these organizations offer. Every effort should be made to see that the work of these different organizations does not overlap or duplicate other work of a similar nature. Wherever possible, a co-operative organization should be founded, following the outlines described in a previous chapter under the discussion of the Children's Welfare Federation of New York City. Such co-operative work will afford the opportunity for quick and effective use of all the facilities that the community may possess for helping its babies.

The Boarding-out System for Babies.—The high death rate that obtains among children born out of wedlock has already been mentioned. In addition, there are a considerable number of babies who, for many reasons, are not kept with their mothers. Such babies in large part are cared for by foundling asylums or institutions of that character. The question as to the relative value of institutional and private home care for babies is a debatable one. Generally speaking, the infant death rate in institutions of this type has usually been very high, ranging from 35 per cent to 50 per cent, based upon admissions to the institution. When it is considered that this death rate must be contrasted with the death rate ranging from 5 to 10 or 12 per cent in the community in which these institutions are located, it is realized that this problem of proper care of the foundling or abandoned baby must receive attention if the baby death rate is to be reduced.

The baby death rates in foundling asylums are not as high to-day as they were a few years ago. Improved methods of baby care and hygiene have been instituted in practically all of these institutions. It must be remembered, moreover, that institutions of this type receive, as a rule, only those babies who have been abandoned or neglected and who are, in the majority of instances, ill or subnormal when they first come under the care of the institution in question.

Dr. Alfred F. Hess has made a study of the mortality rates among children of the Hebrew Infant Asylum in New York City. He states that of the babies received under two years of age from 1911 to 1915, inclusive, the mortality under one year was 163 per 1,000 children, and from 1 to 2 years 80 per 1,000 children. While the statistics given by this institution may be considered as favorable, they cannot be viewed as ideal when compared with infant-mortality rates in the community as a whole, particularly those obtaining in New York City, with which they may legitimately be compared. The fact must be taken into consideration that infants received in foundling hospitals are generally handicapped because of their previous neglect or low vitality and non-resistance to disease at the time of admission.

An investigation as to the mortality rates in asylums and foundling institutions conducted by the Committee on Vital and Social Statistics and the Committee on Pediatrics of the Association for the Study and Prevention of Infant Mortality showed that "during the period 1909-1913, inclusive, 28,210 children under two years of age were cared for in eleven institutions in New York State, and that the death rate for babies under two years for this same period, based upon the total number of children cared for, varied in the different institutions from 183 to 576 per 1,000, with an average mortality rate of 422.5 for the five years. During the years 1909-1912, inclusive, the death rate for children under two years, based upon the estimated population for the state at that age, was 87.4, practically one-fifth of that occurring in the institutions." A further study was made

by these committees of the relation of maternal nursing to the death rate. The committees state, "In one institution which has a large maternity service there were only four deaths of babies during the first week of life among 298 born during the year. This gives a death rate for the first seven days of life of 13.4 per 1,000, which was 3.9 per cent of the total mortality under one year. . . . For the Borough of Manhattan, New York City, it was 23.7, or 17.8 per cent, of the total deaths under one year. . . . This result, which was rather unexpected, would seem to be further evidence of the value of supervision and care during the latter half of pregnancy, for most of these women delivered in the institution having the low death rate were there several months before their babies were born and were under constant supervision and medical nursing.

"It is rather a startling fact that of 1738 babies admitted at various ages under one year 22.7 per cent died before completing the first month of residence and 34.9 per cent before completing the second month. Of all deaths, 44.3 per cent occurred in less than one month after admission and 68.2 per cent in less than two months."

The above are merely indications of the mortality rate in institutions for foundling babies. These high mortality rates are common to the majority of institutions of this type. They are in no sense an indictment of the way in which the institutions are managed. There are very few foundling hospitals at the present time that are not conducted as well as any modern baby hospital. Practically all of these institutions have competent medical boards, use the most improved and modern methods of hygiene, and give the children under their care the best possible health supervision that may be afforded by any institution. The difficulty seems to lie not in neglect, but in the mere fact of "institutionalism." There can be no question whatever that babies cannot be raised wholesale. The most important factor in the welfare of a baby is his mother. Moreover, babies cannot be kept alive by routine care, no matter how efficient or

systematic it may be. Babies who are merely nursed, bathed, and turned at regular intervals are quick to lose their vitality. Every baby needs mothering. There is an indefinable human relationship between a mother and her baby that hardly bears analysis. It is something far more important than breast feeding. It is at once intangible and yet capable of finding concrete expression. It means that every baby must be taken up in his mother's arms not once, but many times a day, that he needs and must receive individual love and attention. This alone may not be enough to save a baby's life, but when combined with intelligent methods of baby care the sum total of the baby's needs have been met. The evidence is overwhelming that, without this mothering, babies have little chance for life or health.

For the present, at least, institutions for foundling children seem to be essential for some babies. The value of keeping the child either in his own home or in the home of a foster-mother is, however, becoming widely recognized. In practically every country in Europe there has been a strong reaction against the use of institutions for either babies or older children. For older children they are used almost exclusively for backward, delinquent, or sick children. Even in these instances the children are kept in the institution only until they can be placed elsewhere. It would seem that, as a result of our knowledge of the high infant death rates in foundling institutions, we should consider these places as proper only for the care of the sick or delicate child, and that all normal babies and children should be given the immeasurably important benefit of home care.

The movement to obtain pensions for widowed mothers or those who have been abandoned by their husbands has received a marked impetus in recent years. Practically all of the states now have state child-welfare laws and boards to administer their functions. The state or the city, instead of contributing toward the support of children in institutions, is enabled, under these laws, to divert the same amount of money for paying for the care of the children in their

own homes. Women who were heretofore forced to go out to work in order to make their living, and consequently were also forced to place their little children in institutions because they could not stay at home to care for them, are enabled, by means of this pension, to remain at home and give their children the care that is essential. These "widows' pensions," however, valuable as they are, do not solve the problem of the baby born out of wedlock or the baby whose mother, or possibly both parents, are dead.

It has been found beyond question of a doubt that the type of baby cared for by the foundling institution will, if placed in a supervised home with an intelligent foster-mother, have a far greater chance of living than if it had remained in the institution. This work of boarding-out babies in private homes has been carried out on a large scale in many of our cities. One of the most interesting pieces of work of this nature is that of the Speedwell system, founded by Dr. Henry Dwight Chapin of New York. The Speedwell system consists simply of boarding out babies in private homes in certain suburban towns. The particular babies that have been cared for by Dr. Chapin's organization have been mainly those who were ready to be discharged from hospital care after recovering from serious illness. Dr. Chapin has stated that when babies are kept in the hospital during convalescence the results are disastrous. Among such infants the death rate has at times reached one hundred per cent. When these babies were taken from the hospitals when the acute symptoms of the illness had subsided and placed in private homes for care during convalescence, the death rate fell almost at once to 40 per cent. The later improvements of teaching and methods have brought this death rate down to a much lower figure.

The boarding-out system for foundling babies will be effective as soon as it is surrounded by health safeguards. The history of "baby farming" is too well known to need more than mere mention, yet it may be stated that the evils of baby farming still exist in many places and that any com-

munity that is carrying out a plan of boarding babies must be constantly on the lookout to discover these places. The baby farm has always been one of the easiest routes to a slow infanticide. The properly supervised boarding home gives the foundling baby his best chance for life and health.

In order that foundling babies boarded out in private homes may receive the best of care, no woman should be allowed to board such a child unless she has received a permit from the local health department allowing her to do so. Stringent regulations governing the homes, the foster-mothers, and the type of care given to the baby should be prepared and followed in every instance. Standards requisite for the granting of a permit should be adjusted for different groups. The homes receiving breast-fed babies may, without harm, be those where the sanitary conditions are less favorable than those where bottle-fed babies are to be cared for. In the case of the breast-fed baby the most important requisite is that the foster-mother should be in good health and intelligent enough to follow directions for the care of the baby. In the case of the bottle-fed baby the highest degree of nursing care must be given, and, in addition, the sanitary and hygienic condition of the home must be excellent.

Standards governing the sanitary conditions of the home are issued by many health departments. Those of the New York City Department of Health may be mentioned as being comprehensive and effective. All women holding permits to board babies in their homes should be visited once each month, and more often, if necessary, by the physician or nurse. At these visits the mothers should be given all necessary instructions for the proper care of the baby. Whenever possible, these babies should be enrolled at the baby health station. Any disobedience of the regulations regarding the care of the baby should result in revocation of the foster-mother's permit.

Results of Boarding Out Babies.—In practically every community where foundling babies have been boarded out in properly supervised homes, the mortality rate of these babies

has not been greater than that which obtained in the community itself. Certain intensive studies have shown the same excellent results. In a personal study carried on in New York City a group of atrophic, premature, and marasmic babies in whom the mortality rate had previously been about 100 per cent were taken from one of the foundling institutions and placed out to board in carefully supervised private homes. A special staff of physicians and nurses from the Bureau of Child Hygiene was placed in charge of this experimental study. The majority of these babies were taken from incubators in the hsopital, but in no instances were incubators used in the homes. Many of the babies lived for many weeks in the homes, wrapped in thick coverings of cotton and surrounded by hot-water bags. Not one of these babies was strong enough to nurse from the breast. They were fed either on breast milk or cow's milk properly modified, and a medicine dropper was used in every case for feeding them. The babies were kept under strict supervision in the homes, and only those foster-mothers selected who were particularly interested in trying to save the lives of these feeble babies. In all, 75 of these babies were placed out to board. At the end of a year and a half 39 of the 75 had died and 36 were living, a mortality rate of 52 per cent, as compared with the 100 per cent obtaining in the same class of infants in the institutions.

CHAPTER IX

THE CHILD OF PRESCHOOL AGE

"If we paid no more attention to our plants than we have to our children, we would now be living in a jungle of weeds."

—Luther Burbank.

The preschool age is included in the period from one to six years of age. Some authorities include the entire period from birth to school age under the general classification of "preschool." For practical purposes in public-health work, however, it is well to eliminate the period of infancy and to base our understanding of the preschool age on the years between one and six. Statistics relating to this period of life are usually compiled by the Census Bureau and other similar statistical organizations as under five years or from one to five years, thus eliminating the fifth year of the child's life. This difference is not sufficiently great to have any particular bearing upon the relation of statistical data to practical work, and for all necessary purposes statistics relating to the age period under five years may be accepted as indicative of the entire conditions of preschool life.

Roughly estimated, children of preschool age comprise about one-tenth of our total population. Based on a population of 110,000,000 in the United States, we would thus have 11,000,000 children belonging to this age group, placing it next in importance to the group of approximately 22,000,000 who belong to the school age. One has only to examine the literature on the subject to discover how little attention has been paid to the health needs of this age group. In recent years much has been done by such organizations as the American Child Health Association to stimulate health

education among preschool children, but the health care of this group still forms the weakest link in our entire chain of public-health work.

A practical program for child hygiene should remedy this difficulty. The plasticity of these children, their extreme receptiveness, and their potential possibilities make the preschool age possibly the most important in the entire cycle of childhood.

Statistics regarding the morbidity and mortality during this period of life are sufficiently startling to warrant immediate attention, but even if these were more favorable than they are, the preschool age group should be reached by all who are interested in the possibilities of public health because of the opportunities that lie in this period of securing a sound basis for health throughout all future life.

The preschool age is the time when the child is most exposed and vulnerable to the common contagious diseases. It is the time when habits, either good or bad, are formed, the time when the child will most eagerly receive and most definitely act upon any impressions he may receive. Not only in the matter of health, but also in everything that makes for what we may call individuality or character, the preschool age offers unlimited possibilities for good or evil. Environmental conditions make a more distinct impression upon the child of this age than at any other time in his life history. Simplicity, regularity, beauty, both of sight and sound, and the high ideals and inspiration of the right environment will inevitably build character. Neglect of this will inevitably destroy it. Health habits formed during this time are rarely, if ever, forgotten, and their application becomes a matter of instinctive and almost subconscious routine.

Our rapidly advancing knowledge of nutrition leads us to the conclusion that the proper nutrition of the child under five years of age will mean not only proper nutrition later on, but will also provide a most important factor in the preven-

tion of disease, both at this time and in later life. Physical defects may be prevented or corrected at such an early time that no secondary or harmful results may follow their occurrence. In fact, the possibilities of health care and health education during the preschool period are so great that they can hardly be overestimated or even expressed to their full significance.

There have been various studies made as to the prevalence of physical defects in children of preschool age. The results shown by these are almost invariably uniform. Studies made in New York City may be taken as examples of existing conditions. In a group of 1,027 preschool-age children examined in the baby health stations in New York City, the following results were obtained:

REPORT OF PRESCHOOL-AGE EXAMINATIONS AT BABY HEALTH STATIONS, NEW YORK CITY

Number of children examined		1,027
Number found normal		481
Number found with defects of teeth only		200
Number found with other defects		458
Defects Found:	Defective vision	5
	Defective hearing	3
	Defective teeth	212
	Defective nasal breathing	141
	Hypertrophied tonsils	199
	Malnutrition	215
	Cardiac affections	12
	Pulmonary disease	6
	Orthopædic affections	32
	Nervous affections	9
	Hernia	3

Another study made of 1,061 preschool age children examined in the public schools of New York City gave the following results, based on percentages. These are given in comparison with the study made of 243,416 examinations of public-school children in order to show the relative occurrence of physical defects in preschool and school age:

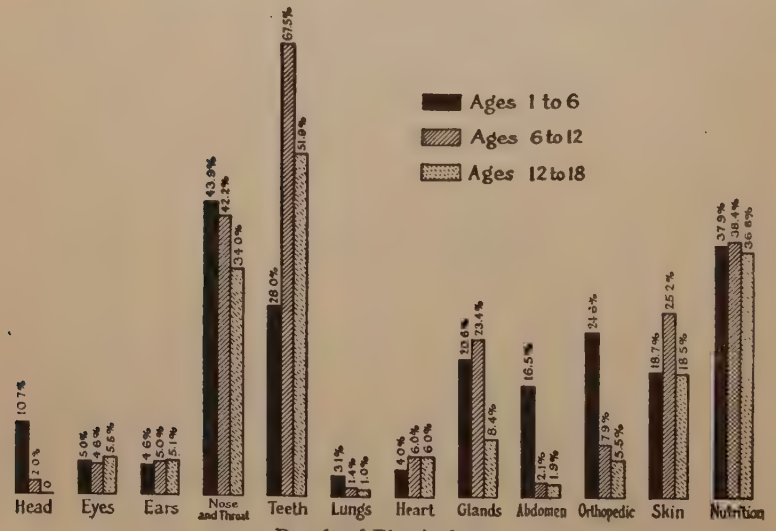
PHYSICAL DEFECTS IN PRESCHOOL AND SCHOOL CHILDREN

	Preschool age 1921 Based on study of 1,061 children	*School age 1920 Based on study of 243,416 exam.*
Hypertrophied tonsils	26.3 per cent	15.3 per cent
Defective nasal breathing	23.1 " "	11.6 " "
Malnutrition 3 and 4	19.2 " "	17.5 " "
Defective teeth	72.6 " "	61.8 " "
Pulmonary disease	1.12 " "	.19 " "
Organic cardiac	.94 " "	1.3 " "
Nervous disease	.66 " "	.5 " "
Orthopædic defects	1.12 " "	.9 " "

CASES FOUND WITH PHYSICAL DEFECTS REQUIRING TREATMENT

Normal	33.3 per cent	30.0 per cent
Teeth as only defect	25.2 " "	34.8 " "
General defects	41.5 " "	35.2 " "

Percentages of Children with Defects



Result of Physical, etc.

Figures for the death-registration area of the United States show that 81 per cent of all deaths from contagious diseases occur in children under five years of age. Morbidity statistics are more difficult to secure, but it has been estimated that about 85 per cent of all cases of contagious diseases at all ages occur in children under five years of age. In the registration area the number of deaths occurring at this age period equals 95 out of every 100 deaths at all ages from whooping cough, 80 out of every 100 deaths from measles, 62 out of every 100 deaths from diphtheria, and 54 out of every 100 deaths from scarlet fever. Out of all deaths that occur at all ages from all causes, one out of every four is that of a child under five years of age.[1]

The importance of the proper health supervision of the child of preschool age is clearly evident. This is the time of all others when children are subjected to more hazardous health risks than at any other period of existence. When one considers the facts that have been quoted with regard to illness and death occurring in this age group, it seems difficult to understand the seeming negligence that has been shown by public-health officials and other workers with regard to proper health supervision of these little children. Within the past eight or ten years there has been a definite attempt to carry out a program for the health of the preschool child. Such work, however, is not yet done with any marked degree of efficiency in any community. The preschool period has well been called "the neglected age." In all probability the reason why it has been so neglected has not been because of any lack of knowledge as to the dangers to be encountered at this time, but rather because no one as yet has been able to find a universal means of public-health work applicable to this age group. Birth registration and the baby health stations have made it possible to reach practically all of the babies that are born in any community. The child of school age is readily reached through the public and

[1] More extended consideration of the various types of contagious diseases will be found in Chapter XII.

other schools, but the in-between child, the one who is no longer an infant, yet is not old enough to go to school, is not associated with any place or activity or means of registration. How to reach the preschool child is a far greater problem than what to do for him after he is under our supervision.

Even if the children of preschool age cannot be reached through any method of universal registration or as easily as the children of school age, we need not be unduly pessimistic about the ultimate success of any method of preschool care. For many years, and in fact until quite recently, it was felt that prenatal supervision and care on any large scale was practically impossible for the reason that the expectant mothers would refuse to go to any health centers and no effective programs had been worked out for reaching any considerable number of pregnant women. But we know now that it is comparatively easy to induce the expectant mother to take advantage of all that the organizations formed for prenatal care have to offer her. For a long time pregnant women accepted their condition without questioning the need for any particular care during this period. Once they were convinced, by means of widespread public-health education, that health supervision during the pregnant period would assure better health for themselves and for their babies and give their babies a better chance of living, they were quick to recognize the force of this argument and to seize the opportunity for the needed supervision of this type. Practically the same condition exists with regard to reaching children of preschool age. It would seem that the main reason we have been unable to extend the work of preschool care is because parents have not yet been convinced of the necessity of any particular health supervision for these children at this time. Until we can convince the father and mother of the preschool child that he needs health care, we shall probably not be able to give it to him; but once they understand that his needs in this direction are as great as they were when he was under one year of age, and greater

than they will be when he is over six years of age, there will be no difficulty in reaching all of the preschool children that can possibly be supervised or cared for.

The preschool age is not only the time when we may prevent the present high sickness and death rates from contagious diseases, but it is in a far larger sense the time of all others when we must lay the foundation for good health throughout life. The time to prevent physical defects in children is before, not after they go to school. The time to lay a sound basis for proper nutrition is during the years under five, and the time to assure the child sound and lasting health is during this period when growth and development are more active than they are at any other age.

Dr. Arnold Gesell, in discussing the significance of the preschool period, states that "the sixth-year molars may be regarded as a convenient punctuation point in the development of a human being. The eruption of these first permanent molars marks the termination of the early fundamental years of existence. These are the preschool years. The next six years bring the child to the teens (and to his second molars), and if he passes through his elementary education at an average rate he is then ready for a junior high school, which will take him another six years to complete. At the age of eighteen he may be ready for college and professional training. His wisdom tooth will not have erupted ordinarily until the close of the twenty-fourth year. We have here four periods, each about six years in length. . . . The first sexennium is the preschool period; the second is the school period; the third is the period of early adolescence; the fourth of later adolescence." Doctor Gesell further states that "the preschool period is biologically the most important period in the development of an individual, for the simple but sufficient reason that *it comes first.* Coming first in the dynamic sequence it inevitably influences all subsequent development. . . . The very laws of growth make these the most formative of all years. The younger the creature, the more rapid its growth. When measured

Average Weight for Height Tables, Prepared by Robert M. Woodbury, Ph.D., Children's Bureau, U. S. Department of Labor.

WEIGHT–HEIGHT–AGE TABLE FOR BOYS FROM BIRTH TO SCHOOL AGE

Height (inches)	Average weight for height (pounds)	1 mo.	3 mos.	6 mos.	9 mos.	12 mos.	18 mos.	24 mos.	30 mos.	36 mos.	48 mos.	60 mos.	72 mos.
20	8	8											
21	9½	9	10										
22	10½	10	11										
23	12	11	12	13									
24	13½	12	13	14									
25	15	13	14	15	16								
26	16½		15	17	17	18							
27	18		16	18	18	19							
28	19½			19	19	20	20						
29	20½			20	21	21	21						
30	22			22	22	22	22	22					
31	23				23	23	23	23	24				
32	24½				24	24	24	25	25				
33	26					26	26	26	26	26			
34	27						27	27	27	27			
35	29½						29	29	29	29	29		
36	31							30	31	31	31		
37	32							32	32	32	32	32	
38	33½								33	33	33	34	
39	35								35	35	35	35	
40	36½									36	36	36	36
41	38										38	38	38
42	39½										39	39	39
43	41½										41	41	41
44	43½											43	43
45	45½											45	45
46	48												48
47	50												50
48	52½												52
49	55												55

NOTES:

1. Weight is stated to the nearest pound; height to the nearest inch; age to the nearest birthday.

2. Up to and including 34 inches the *weights are net.* Above this the following amounts have been added for clothing (shoes, coats and sweaters are not included):

35 to 39 in. 1¼ pounds
40 to 44 in. 1½ pounds
45 to 49 in. 1¾ pounds.

Take heights with a square consisting of two flat pieces of wood joined at right angles (a book may be used). The child is placed in an erect position, with heels and shoulders against the wall or wide board upon which has been marked or pasted an accurate measure (a new tape measure may be tacked on the board).

by percentage of increment in weight and height, the growth activity of the first six years is incomparably greater than that for any subsequent period of six years."

Methods of Reaching the Preschool Child.—There is a difference of opinion as to whether the care of the preschool child may be considered as a logical continuance of infant care, or whether we should regard this period as more particularly concerned with the health of the child before he goes to school. The use of the term "preschool" would seem to imply the latter, but for practical purposes the most successful way of reaching these children and keeping them under supervision has been found to be the extended use of baby or child health centers. The common habit of terminating the care of the babies, as far as the baby health station is concerned, when the child reaches the age of one or two years, should be discontinued. If the registration of babies at the station is so large that the doctor and nurse cannot give adequate health supervision to older children, the work may be separated so that the facilities of the station are used, in the morning for the babies and in the afternoon for the preschool child. The better way is to consider that the years of the child are a sequence and that the health care must be continuous. Fortunately, many communities are now adopting this practice and the baby health center is being considered as a child-welfare center and a continuous

WEIGHT–HEIGHT–AGE TABLE FOR GIRLS FROM BIRTH TO SCHOOL AGE

Height (inches)	Average weight for height (pounds)	1 mo.	3 mos.	6 mos.	9 mos.	12 mos.	18 mos.	24 mos.	30 mos.	36 mos.	48 mos.	60 mos.	72 mos.
20	8	8											
21	9	9	10										
22	10½	10	11										
23	12	11	12	13									
24	13½	12	13	14	14								
25	15	13	14	15	15								
26	16½		15	16	17	17							
27	17½		16	17	18	18							
28	19			19	19	19	19						
29	20			19	20	20	20						
30	21½			21	21	21	21	21					
31	22½				22	22	23	23	23				
32	24					23	24	24	24	25			
33	25						25	25	25	26			
34	26½						26	26	26	27			
35	29						29	29	29	29	29		
36	30							30	30	30	30	31	
37	31½							31	31	31	31	32	
38	32½								33	33	33	33	
39	34								34	34	34	34	34
40	35½									35	36	36	36
41	37½										37	37	37
42	39										39	39	39
43	41										40	41	41
44	42½											42	42
45	45												45
46	47½												47
47	50												50
48	52½												52

NOTES:

1. Weight is stated to the nearest pound; height to the nearest inch; age to the nearest month.

2. Up to and including 34 inches the *weights are net.* Above this the

following amounts have been added for clothing (shoes and sweaters are not included):

35 to 39 in. 1 pound
40 to 44 in. 1½ pounds
45 to 49 in. 1¾ pounds.

supervision maintained of the children from birth to the age of school entrance.

In health work there are no artificial divisions that coincide with the different ages of childhood. Health care must be continuous and consecutive; and if we are considering the health of the child alone, it makes little difference whether we supervise it during the preschool age as a continuation of our program for baby care or whether we consider it as a preparation for school life. There are certain practical objections to using the school as a center for the care of the preschool child. The main objection has to do with the use of school funds for this purpose. Usually these funds must be expended solely for educational purposes and even when an appropriation is included for the health supervision of school children it is usually designated for such purpose only and cannot be used to conserve the health of children other than those that are in attendance at school. Where school work is carried on under the board of health no such difficulty exists, and in such cases it has been found that the use of the school for reaching the preschool child is of extreme value.

In New York City, for the past few years, the local bureau of child hygiene has co-operated with the Red Cross and the Association for Improving the Condition of the Poor in conducting experimental studies to determine the value and effectiveness of attempting to reach the child of preschool age through the medium of the public schools. Certain schools have been selected for this purpose. In June of each year the childen in the school are canvassed and asked to bring to the school their brothers and sisters who are under six years of age. The school doctors and nurses, aided by nurses and other workers from the other organizations mentioned, have made physical examinations of these

TABLE SHOWING RATE OF GROWTH OF SMALL AND LARGE TYPES OF HEALTHY BOYS[1]

Birth	Weight	7	to 9	pounds
	Height	20	to 21	inches
	Chest	13	to 13½	"
	Head	13½	to 14	"
One year	Weight	20	to 23	pounds
	Height	28½	to 31	inches
	Chest	18	to 19½	"
	Head	18¼	to 19	"
Two years	Weight	25	to 29¾	pounds
	Height	32½	to 36	inches
	Chest	19	to 20½	"
	Head	19	to 19½	"
Three years	Weight	30	to 35	pounds
	Height	36	to 39½	inches
	Chest	19½	to 21½	"
	Head	19½	to 20	"
Four years	Weight	34	to 39½	pounds
	Height	39	to 42½	inches
	Chest	20	to 22	"
	Head	19¾	to 20¼	"
Five years	Weight	38	to 44	pounds
	Height	41½	to 45	inches
	Chest	20½	to 22½	"
	Head	20	to 20½	"

[1] Holt.

NOTES:

All weights and measurements are without clothes. The first column indicates the growth of small and the second of large children.

The weights for girls of different types are about one pound less than those of boys. Their measurements at the different ages are from one-fourth to one-half inch less than those of boys.

children and sufficient home visits to induce the parents to obtain for them the needed medical care when such care was indicated. Every effort has been made to see that all physical defects existing in these children are corrected before they enter school. The extent of physical defects occurring in these children has already been referred to. Efforts of both treatment and home care have been successful, and when it

is possible to use the schools for this purpose the value of such a method is evident.

In order that the children in the schools may be stimulated to bring their little brothers and sisters for this examination, various forms of class competition have been devised. One of the most successful is to place in each classroom a paper banner or service flag. When a child brings a brother or sister for examination a star is pasted on the flag in that child's classroom. The idea was suggested, of course, by the service flags and banners used during the war. The competition by classes to obtain the greatest number of stars on their banner is effective in bringing a large number of children of preschool age for the physical examination. Awards in the shape of special school recognition or some trophy should be made to the classes showing the highest number of stars on their banners.

The Hygiene of Preschool Life.—While we commonly associate the occurrence of physical defects with school life, studies have shown that most types of physical defects are far more predominant during the preschool age than they are during the school age. An extended reference to this matter will be made when discussing the age and sex incidence of physical defects in the chapter on health of the school child. Certainly, we cannot dispute the clear evidence that prevention of the common physical defects occurring in children should come before they go to school and not afterward, and that the time when such defects can be prevented lies in the period between two and six years of age.

All children of preschool age should have a physical examination made once every six months, and more often if the child is delicate or shows the need of particular attention. The results of such examinations, whether made in the children's health center or in the school, should be carefully recorded and considered as part of the child's future school health record. Whenever any physical or mental defect is found, home visits should be made by the nurse, and the mother carefully instructed in every detail of home and per-

sonal hygiene as it relates to the welfare of the child. If physical defects already exist, they should be corrected at this time, before there have been any harmful sequellæ or complications resulting from them. The diet of the preschool child needs particular attention. Undernourishment existing at this age is a critical and menacing matter. Monthly weighing and measuring of these children is of great value in impressing upon the mother the necessity for regular increase in the child's weight and corresponding nutritional condition. Portable scales may be carried to the homes for this purpose, and the mother should have a health chart upon which may be recorded the increase or decrease in weight of her child.

Day Nurseries.—The importance of the day nursery in the program for proper care of the preschool child has not been fully recognized in this country. The extension of any facilities which tend toward separation of children from the care of their own mothers is not to be recommended. But until our social and economic conditions are better adjusted than they are at present, the day nursery is a necessity. Where it exists it should be conducted in the most efficient manner. Nurseries have within them possibilities for serving as centers for the dissemination of information regarding the health care of young children. It is obvious, too, that they should be maintained under strict and competent supervision and their health standards should be adequate. These health standards should include proper and sanitary construction and equipment of the building, a program for general hygiene and proper maintenance of the nursery hygiene, medical supervision of the children for the purpose of controlling contagious diseases and the prevention of disease in general, and physical examinations on entrance and at stated intervals thereafter for the prevention or detection of acute diseases and the prevention or correction of existing physical defects. In addition, the routine of the day nursery must include the maintenance of proper health standards of

the rooms in which the children are kept and the supervision of the dietary and hygiene of the child's life.

History of Day Nurseries.—The present type of day nursery is modeled upon the nursery school or *crèche.* The first nursery school of which we have any knowledge was founded in Walbach, France, by Jean Frederic Oberlin. In England in 1800 Robert Owen opened an infants' school which had some of the features of our present-day nursery. It is probable, however, that the first so-called "day nursery" of the modern type was organized in France in 1844. In 1869 France organized a nursery society, and the idea has spread rapidly in that country. Dr. Clothilde Mulon of the French War Department, who was assigned to duty in charge of the *crèches* in France during the recent war, was mainly responsible for the great extension of day nurseries in France. There they have been established in connection with the factories, the mills, and even the department stores where women are employed.

Spain founded her first nursery in 1855 and Russia in 1864. While there have been infant schools in the United States as early as 1816, the first real day nursery was instituted in connection with the Nursery and Child's Hospital in New York City in 1854. In 1858 one was organized in Troy, New York. In 1863 a day nursery was opened in Philadelphia. At the present time there are over 600 day-nurseries in the United States, and a National Federation of Day Nurseries, founded in Chicago in 1898, is an active organization with an excellent program for raising the standards of the nurseries throughout the country.

Day nurseries are usually maintained as philanthropic ventures. They have been established in this country mainly in connection with social settlements and churches. Some few department stores have taken advantage of the idea and maintain nurseries to care for children while their mothers are shopping. States and municipalities have not established them under their immediate control. There are very few states that license day nurseries, but their possibilities for

affecting the health and welfare of the child are so great that their conduct and management should be under the strict supervision of governmental authorities.

The Relation of the Day Nursery to the Health of the Preschool Child.—The conduct of the day nursery may affect the health of the child in three ways:

(a) through dissemination of contagious diseases;
(b) through occurrence of physical defects;
(c) through maintenance of proper nutrition.

For an outline of the proper health standards for day nurseries, reference is made to the standards of child welfare as published by the Children's Bureau. Properly conducted, the day nursery may be an important factor in the prevention of illness and death in young children. It also has a large opportunity for helpful service in that it may serve as a center of instruction for mothers.

Construction and Equipment.—Whenever it is possible, the day nursery should occupy a separate building constructed for the purpose. It may be assumed that the location of these nurseries will always be where the need is greatest, which generally means in the more crowded parts of communities. For this reason, separate buildings are rarely feasible or available and changes in construction must be made in already existing tenements or dwellings. Frequently day nurseries can be made part of community health centers or social settlements. As parents have become accustomed to these neighborhood houses, they are particularly desirable for this purpose, giving the mothers a sense of security when leaving their babies or very young children.

Adequate space, fresh air, and sunshine are the main requisites to be considered in the selection of day-nursery premises. If possible, outdoor space should be provided and outdoor life encouraged through the greater part of the year. If yards are not available, roofs may be utilized.

Necessary Rooms.—The minimum requirements for rooms are (a) kindergarten or playroom for children from two to six years of age, (b) nursery with cribs for children

under two years of age, (c) dining room, (d) kitchen, (e) lavatory and bathroom, (f) cloak room, (g) isolation room.

Kindergarten.—The kindergarten or playroom for the children from two to six years of age should provide at least fifteen square feet of floor space for each child. Adequate ventilation, lighting, and heating should be provided. Except in extremely cold weather, the ventilation should be maintained by means of open windows. The rooms should have the necessary kindergarten furniture, and, in addition, wooden or iron bed frames or bunks so arranged that they may be let down from the wall and form low easy day beds for the children.

Nursery for Children under Two Years.—Separate iron beds or cribs must be provided for each child. They should be so placed that there will be a space of two feet on all sides except where the head or sides of a bed or crib touch the wall. Woven iron springs should be provided, over which a folded blanket, protected by a rubber or oilcloth sheeting, must be placed. Mattresses should never be allowed. A minimum of two hundred cubic feet of air space for each child should be provided.

Dining Room.—The air and floor space requirements heretofore mentioned must be maintained in the dining room, and adequate light and ventilation are essential.

Kitchen.—The standards in kitchen equipment relate to simplicity, accessibility, cleanliness, and ease with which both utensils and equipment may be kept clean. The exact type of equipment does not need to be standardized, but should be adapted to individual requirements. Order and cleanliness, however, must be insisted upon at all times.

Lavatory and Bathroom.—Washbasins should be sufficiently low to be easily used by the children. Running water should be provided and each child should have for his exclusive use a towel, toothbrush, drinking cup, and comb. The toilets should be of child's size, so that they may be used by the children without assistance. They should be of modern type, easily flushed, and in the ratio of one toilet to

each twenty children. The use of common washcloths, towels, combs, and hair brushes should be prohibited.

Cloakroom.—A well-ventilated room for children's outer garments must be provided. In this room the clothing removed from the children in the morning must be placed, and unless all clothing worn by the child on admission is clean, it should be changed for clothing belonging to the day nursery, or a suitable overapron (the property of the day nursery) should be worn through the day and each individual apron marked for identification unless a clean apron is provided daily.

Isolation Room.—An isolation room for cases of suspected contagious disease should be provided in each day nursery.

General Hygiene and Maintenance of Nursery Routine.—The purpose of the day nursery is not merely to provide a shelter for children during the daytime. Its ideal must be, further, to afford them complete protection from disease and to establish necessary health habits. The health control, therefore, resolves itself into several parts:

1. The control of contagious diseases. Such procedure should be:

(a) The department of health and the nursery physician should be notified immediately by telephone of any suspicious rash or illness occurring among the children at any time, and children so affected should be placed at once in the isolation room.

(b) The matron must make daily inquiry of each mother or other person bringing a child to the nursery as to whether or not any sickness exists in the child's home, and if suspicion is aroused as to the possibility of such home sickness being of an infectious nature, the child should be excluded and the health department notified.

(c) Each child as it enters the nursery must be in-

spected by a competent person, either the matron or the nurse.

(d) The physician of the day nursery must make a systematic examination of every regularly attending child at least twice a month, such examinations to be made at least two weeks apart.

(e) When any child who has not previously attended the day nursery applies for admission, the physician should examine such child at once and exclude it from attendance at the nursery if any suspicious signs of infectious disease are present. If no infectious disease is found to exist, the matron in charge of the nursery should be given a certificate to that effect and the child admitted.

(f) Whenever, in the case of female children, there is evidence of any vaginal discharge on the clothing, a smear for bacteriological diagnosis should be made and examined to determine the presence of gonorrhæal vaginitis.

2. Medical inspection and health supervision.

(a) There should be on file in the office of the nursery an original certificate of health, signed by the nursery physician for each child who is a regular attendant.

(b) There should be on file in the nursery a record for each child regularly attending, showing that it has been examined by the nursery physician at least twice a month, such examinations being at least two weeks apart.

(c) When, upon examination, a child is found to be suffering from any physical defect or abnormality or from any condition which requires health supervision or instruction, the case should be refered to the nurse, whose duty it should be to supervise the health care of the child until proper treatment has been obtained.

3. A nurse should be attached to each such nursery whose duty it should be to:

(a) assist the doctor in the physical examinations;
(b) make daily visits to the nursery to treat minor ailments, make regular health inspection of the children, and give health advice or aid when indicated;
(c) be responsible for the cleanliness of the children and the maintenance of the health regulations of the board of health with regard to sanitation, hygiene, and health care;
(d) visit the homes of the children at regular intervals, instructing the families as to the individual needs of the children with reference to home hygiene, feeding, and physical care.

4. Care of Infants:

(a) Adequate care must be taken of the milk, bottles, and nipples used in infant feeding.
(b) Individual formulæ should be prescribed for each child after examination by the nursery physician.
(c) Proper infant care and hygiene must be maintained at all times.
(d) Each infant, on admission, must have its clothing removed, be given a bath, be dressed in fresh clothing belonging to the nursery, and kept in such clothing during the day.
(e) All diapers that may become soiled during the day must be immediately placed in water and thereafter thoroughly washed and boiled. No diapers in any unclean condition should be removed from the premises.

5. Care of children from two to six years of age.

(a) Each child from two to six years of age should receive one hot meal in the middle of the day.

This meal should include one hot meat or vegetable dish, with soup, and cocoa or milk. Bread, fruit, and eggs should be included in the dietary.

(b) Each child should have a morning lunch at eleven o'clock and an afternoon lunch at four o'clock, consisting of a glass of milk and bread and butter.

(c) The total amount of milk supplied to children between two and six years of age should not be less than three pints per capita per day. Part of this may be given to the child in the form of soups, custards, or other types of food.

(d) Each child should have a suitable rest period at a regular time each day. Experience in the open-air classes has seemed to prove that the morning rest hour is the most desirable. Children may be given their morning lunch at eleven o'clock, and then required to lie on the cot beds which, when not in use, fold up against the wall. They should be encouraged to sleep during this period, and sitting up or talking should not be allowed.

(e) Regular and systematic exercise is essential. Group games, simple setting-up exercises, or unrestricted play may be allowed. Biologically, children of this age need much activity and opportunity for free action. Lesson periods, therefore, should be short, and children should not be required to sit still for more than a few minutes at a time. Chairs should be movable and the child's interest should be kept up through the type of educational games which allow free movement and free interpretation. Whenever exercises such as deep breathing, drills, setting-up exercises, or other vigorous forms of physical exertion are practiced, the windows of the playroom should be opened except in severely cold or stormy weather. Whenever possible, the exercises mentioned should be taken out-of-doors, either in the

yard or on the roof. In warm weather, practically all the classroom work should be done in the open air.

(f) Children must be kept clean at all times and particular attention should be paid to the condition of the hair.

Day-and-night Shelters.—A new field of service for day nurseries has been found in the use of their facilities as what are known as "day-and-night shelters." While one of the main values of the day-nursery idea is that it separates the child from his parents only during the daytime, and allows the mother to have the home care during the evening, night, and early morning, there are some children for whom even this amount of home care is impossible. This group of children includes those whose mothers are forced to be away from home for a limited period of time. Many women who have little children to care for may find it necessary to go to a hospital or to be away from home for some other important reason. In such cases the children of the family should not, of course, be committed to institutions, and yet there has been no extended provision made for caring for them during the time that their mother is away. Many years ago the Children's Welfare Federation of New York City, through its committee on day nurseries, induced a few nurseries to employ an extra nurse for night duty and made it possible for children to be received for continuous care, both day and night, for periods ranging from one to three or four weeks. As a method of meeting a definite need as well as for conserving the health of the child, these day-and-night shelters have been a great success. Their value lies in the opportunity they afford of giving *temporary* continuous care to children who would otherwise be neglected. When day nurseries, however, give this service, a definite limit should be put upon the time that children may stay in the nursery. Otherwise, the plan would defeat its own purpose by furthering the institutional idea.

CHAPTER X

THE CHILD OF SCHOOL AGE

School Medical Inspection

"The ideal to which we should drive is that there should be no child in America that has not been born under proper conditions, that does not live in hygienic surroundings, that ever suffers from undernourishment, that does not have prompt and efficient medical attention and inspection, that does not receive primary instruction in the elements of hygiene and good health, that every child in America should be free of deleterious labor, should participate in our great public-school system, and should have full participation in the joys of childhood. For, if we can give these opportunities to but one generation, the great sector of our national problems will have been solved."—Herbert Hoover.

The responsibility of the government for the health care of children of school age has been recognized by practically every civilized country. The systems that have been put into effect generally are those that pertain to the health care of children attending school, and the method has come to be known as "school medical inspection." This title is unfortunate in that it places the emphasis upon the school rather than upon the child. It would be better if we would use the term "health supervision of school children," but it is probable that the early term has become so fixed and standardized that no change in it may be expected. The physicians who were first employed in this work were called "school medical inspectors." Again, this must be considered as an unfortunate designation. However, the term "school doctor" is widely used, and the school nurse has always kept her designation.

The earliest history of any governmental attempt to con-

trol or supervise the health of children in school occurred in France in 1833. This law and the royal ordinance of 1837 charged the school authorities with the duty of providing proper sanitary conditions of the school premises and the supervision of the health of the school children. In 1842 a governmental decree was promulgated in Paris providing that all public schools in that city have some form of health supervision. School medical inspection, as we know it to-day, may be said to date from that time. This early work, however, was not extensive or particularly valuable. It was not until 1897 that France had any system of school medical inspection that might be called satisfactory. Germany's system of control of the health of school children was instituted in Dresden in 1867. It consisted only of tests of vision. The modern type of school medical inspection was instituted in Frankfort-on-Main in 1889.

The dates upon which various foreign countries and the United States began school medical inspection were as follows:

France	1833	Argentine Republic and Chile	1888
Germany	1867	England (London)	1891
Sweden	1868	United States (Boston)	1894
Russia	1871	Mexico	1896
Austria	1873	Japan	1898
Belgium	1874	Bulgaria	1904
Egypt	1882	Australia	1906
Norway	1885	Tasmania	1906
		Canada (Montreal)	1906

In the United States, the first city to adopt a system of school medical inspection was Boston in 1894. During that year there was an extended epidemic of diphtheria among children in the public schools. In order to combat it, the then Commissioner of Health—Doctor Durgin—sent physicians into the schools to examine the children for the purpose of determining whether or not they were ill from any contagious diseases, particularly diphtheria. In 1895 Philadelphia instituted a system for the control of the occurrence

of contagious diseases in public-school children, and in 1897 New York began a similar type of school medical inspection. These earlier forms of health supervision in the schools related solely to medical inspection of those children referred by the teachers as being possibly affected with some contagious disease. In 1905 New York City began the system of examining each school child to determine the presence of non-contagious physical defects.

The latest available information, collected by Clark and Collins of the United States Public Health Service, shows that a total of twenty-nine states and territories have enacted legislation relative to school medical inspection, designating some state agency to administer the law. In fifteen states the responsibility is lodged in both the department of education and the department of health. In six states the department of education is given full authority, and in eight states the authority is lodged in boards or departments of health. In nine states having these laws no mandatory authority is designated to administer the law. Three states give authority to localities to employ public-health nurses. In nine other states where there are no specific laws relating to school medical inspection, most of the cities in these states have organized such systems, acting under their general health powers.

The fifteen states where the law is administered jointly by the state health and state educational authorities are Alabama, Idaho, Indiana, Louisiana, Maine, Maryland, Massachusetts, New Hampshire, New York, North Carolina, Ohio, Utah, Vermont, Virginia and Wisconsin. The eight states where the school health law is administered by the state or district health department are Florida, Georgia, Kentucky, Nebraska, Nevada, Pennsylvania, District of Columbia, and Hawaii. The six states where the responsibility is lodged in the state departments of education are Arkansas, California, Colorado, New Jersey, Rhode Island, and Wyoming. The nine states giving no decision as to authority are Arizona, Connecticut, Delaware, Iowa, Kansas, Montana, North

Dakota, Washington, and West Virginia. The three states that allow counties and other public units to employ public-health nurses to examine school children are Minnesota, Oregon, and South Carolina. The nine states having no specific medical inspection laws, but in which cities or towns carry on such system by virtue of their local authority are Illinois, Michigan, Mississippi, Missouri, New Mexico, Oklahoma, South Dakota, Tennessee, and Texas.

In the following list of the states the laws are mandatory for all school districts: Arizona (teachers only are to be examined), Colorado, District of Columbia, Florida, Idaho, Kansas (dental mandatory; physical permissive), Louisiana, Massachusetts, Montana, Nebraska, Nevada, New Hampshire, New Jersey, North Carolina, Pennsylvania, Rhode Island, Utah, Vermont, Virginia, Wisconsin.

The four states where the law is mandatory for certain districts, but where no provision is made for inspection in other districts, are:

Kentucky (mandatory in counties with full-time health department);

Maine (mandatory in cities under 40,000 population);

New York (mandatory in all localities except first-class cities);

Wyoming (mandatory in incorporated cities or towns).

The five states where the law is mandatory for certain school districts and permissive for all others are:

Alabama (mandatory in counties with a full-time county health officer);

Connecticut (mandatory in cities of over 10,000 population);

Georgia (mandatory in counties with a full-time county health officer);

Indiana (mandatory in cities over 100,000 in population);

West Virginia (mandatory in all independent school districts).

The five states having permissive laws for all districts

are California, Delaware, Maryland, North Dakota, and Ohio.

The State of Washington has a permissive law for first-class school districts, with no provision for other places. Thirteen states either have no school medical inspection laws or have laws which do not specify whether the inspection is mandatory or permissive. The extent and character of the medical examinations that are to be made of the school children are specified by law in twenty-four states and the District of Columbia, and vary from the laws which require only dental examinations or those that contain the broad provision for a "proper medical and dental examination" to those laws which specify in detail the character of the defects for which an examination is to be made. In eighteen states, Hawaii and the District of Columbia, the laws provide that the examination of the children must be made by persons of medical training—that is, physicians, oculists, dentists, or nurses. In eleven states it is required that the physical examinations are to be made in some schools by teachers, in others by physicians or nurses, and in still others by the teachers and physicians jointly. In five states the teacher is required to make the examination. The other states have no specific regulations with regard to this matter.

Control by Boards of Health or Boards of Education.—The earliest types of school medical inspection in the United States were those that related to the detection of cases of contagious diseases, and naturally fell under the jurisdiction of and as a result of the powers of health boards. From the beginning the predominant idea was that of the danger that might exist in gathering together large groups of children and keeping them closely associated for many hours. This was naturally felt to be a situation which might easily result in the spread of infection.

When the Board of Health of New York City in 1905 determined that the physical examination of children of school age was a legitimate part of the public-health program, and that the prevention of contagious diseases, as

well as the prevention of other illnesses and the various types of physical defects, was influenced largely by the environmental conditions surrounding children of the susceptible age, the question as to the responsibility for this work took on a new aspect. The problem of school hygiene, including proper classroom construction and maintenance, was found to bear an intimate relation to health. These matters had always been considered the province of boards of education and in only exceptional instances had boards of health interfered or assumed any control. Later, when health teaching became a part of the school-health program, the educational authorities again felt that this was a matter which concerned the education and not the health authorities.

Whether health or educational boards should have control of the health supervision of school children is still a debatable question. Educational authorities place their argument mainly upon the following: while the children are in school they are, and must necessarily be, directly under the control of the educational authorities; the responsibility for the sanitation, equipment, and routine methods in the schools belongs to them; all teaching is their function, whether it be that of health or other subjects; and any divided authority or responsibility leads to confusion and inefficiency. Boards of health, on the other hand, generally rest their stand upon the propositions that all health matters in any community must, and necessarily are, the responsibility of the board of health; that it is their duty to care for the health of all of the population and not confine their efforts to the health of the children up to school age and from the time they leave school; that the health of children from five to fifteen years of age is of enormous importance to the community; and that health boards cannot neglect the supervision of children of this age without serious detriment to the health of the people as a whole or without gross negligence. They feel that they have the machinery and the specialized knowledge requisite for proper health supervision; that it is impossible to separate the control of contagious diseases from the rest of the health

program; and that they must assume responsibility over the general health care of the child.

Summed up, boards of health regard the children of from five to fifteen as children of "school age" rather than "school children," and consider that the school simply offers a convenient way in which to reach one-fifth of the total population, during those years when this group is especially susceptible to communicable diseases and when the foundation for health in later life must be securely laid. They also take the attitude that, as the schools generally have the children under their control only five hours out of the twenty-four of each day and for a usual maximum of only 195 out of the 365 days of each year, they are not capable of carrying on any well-conceived or extensive program for the health supervision of this group; and, finally, they feel that they have no justification for turning over to any other group the responsibility for the health of any part of the population.

The rapid extension of school medical inspection under the control of the boards of education of cities, towns, and rural communities is undoubtedly due to the fact that the health authorities in many states have had neither the machinery nor the initiative to institute or carry on this work. In nearly all of our smaller cities, towns, and country districts the school boards or school trustees are better organized, and in many cases are far more efficient, than the local boards of health. The tendency toward board of education control, then, has seemed to be more the result of preparedness and expediency than because of the recognition in any large way of the part that the health supervision of school children plays in the whole health program.

It would seem that the ideal solution of the question as to who should be responsible for the health control of school children—boards of health or boards of education—could easily be met by making both boards responsible and having them work in co-operation. That this can be done successfully has been proved in many instances. Two notable types are the systems in Philadelphia (Pennsylvania) and Cleve-

land (Ohio). Other cities seem to be tending more and more toward this combined plan. The best solution at present would seem to be to have all employees of the school medical-inspection service placed on the payroll of the board of education, so that they might be classified as members of the staff of the board of education. Their work should be carried out according to a program planned and supervised by the local board of health, who should be responsible for the technique and the results. Matters pertaining to the hygiene of the school building should be referred to the board of health for suggestions, and if attention to such matters is needed, they should then be referred to the board of education for action. Health teaching in the schools should be carried on by the educational authorities, with the subject matter of such teaching approved or suggested by the health authorities. Such a combined system might well do away with whatever friction exists at the present time. Only through such a form of co-ordination between boards of education and boards of health can we have truly efficient supervision of the children of school age in this country.

The Objects and Methods of School Medical Inspection.—The one essential object of school medical inspection is to assure sound health to all children of school age. To accomplish this, certain fundamental provisions are considered essential:

(1) Provision of proper sanitation of schoolhouses.
(2) Maintenance of high standards of school hygiene in the construction, equipment and care of classrooms.
(3) Adjustment of the routine of school life so that the child's life may be safeguarded and disease prevented.
(4) Prevention of the occurrence of contagious diseases.
(5) Prevention or early detection of physical or mental defects or ill health.

(6) Adjustment of the hygiene of the home to suit the needs of the child.
(7) Provision, when necessary, of adequate facilities for the proper treatment of physical abnormalities.
(8) Education of the children in habits pertaining to their own health.

Methods.—The methods whereby we may attain these objects have been fairly well standardized, and the usual outline of a system of school medical inspection is as follows:

(1) Sanitary survey of the school building, surroundings, and equipment at the beginning of each term, with correction of all unsanitary and unhygienic conditions.
(2) Supervision throughout the year of the sanitary and hygienic conditions of the school building.
(3) Daily inspection of all children referred by the teacher as being suspected of having a contagious disease and immediate exclusion from school of all affected children until the termination of the illness, with proper isolation during that period.
(4) Routine inspection of all children in the classrooms at stated intervals, preferably once each month, to detect any incipient cases of acute disease, whether of a contagious or non-contagious character, to detect the occurrence of any physical or mental defects and to give individual or class instruction in personal hygiene.
(5) Treatment in the school building of children affected with contagious eye or skin disease, allowing them to remain in school while under such treatment.
(6) Physical examination of all school children on entrance to school and at stated periods thereafter, with the necessary follow-up work in the homes to secure adequate treatment for any physical defects which may be found to exist.

(7) Yearly testing of vision and hearing of school children.

(8) Home visiting for the purpose of securing the proper environmental conditions in the home, necessary for the prevention of disease and the assurance of sound health to the children and to secure proper medical or surgical treatment for the children when this is indicated.

(9) Organization of special classes for those children whose physical or mental handicaps make it difficult for them to take their places in regular classroom work.

(10) Provision of a system of health education for the purpose of securing the co-operation of the children in applying to themselves the rules of healthy living.

(11) Physical examination and health supervision of teachers.

(12) Provision in the schools of those aids, such as school lunches, health leagues, health crusaders, or other forms of health activities or adjustments, which may be necessary to promote the principles and practice of good health.

Administration.

Staff.—Systems of school medical inspection should be under the direct administrative control of a physician employed on full time as a director of the work. Such a physician should have the following qualifications:

(1) Adequate training in public health work.

(2) Experience in private practice with particular reference to pediatrics.

(3) Administrative ability.

Owing to the important position that nurses hold in any adequate school medical-inspection service there should be a superintendent of nurses attached to the staff of the director.

The employment of additional medical inspectors who may be on part or full time, additional nurses who should devote themselves exclusively to school nursing, dentists, dental hygienists, oculists, and other specialists will depend upon the size and needs of the community and the available appropriation.

Organization and Budgets.—Organization will depend upon the health needs of the children and the size of the community. Various forms of organization are in effect at the present time. These may include the employment of

(1) school doctor or doctors alone;
(2) school doctors and nurses;
(3) school nurses alone;
(4) teachers alone.

(1) School Doctors Alone.—Although some of the state laws make particular designation of the employment of school doctors, the habit of their employment without the additional use of school nurses is happily decreasing. It has been the common experience that where doctors alone are employed the results have been largely statistical and have contributed little to the health of the children. Where a nurse's services are not available, however, the doctor and teacher may co-operate to carry on a fairly effective system of supervision. This may include a sanitary survey of the school building and equipment, with correction of insanitary and unhygienic conditions; examination of children who are suspected of having contagious disease, with immediate exclusion from school and subsequent isolation if any such disease is found to exist; examination of all children who have been absent from school for any reason before they are admitted to the classroom; complete physical examination of the children at stated intervals, with printed notices sent to the parents in every instance where physical defects are found; health talks to the children in the classrooms and conferences with the mothers. If this work is to be effective the teacher must show an active co-operation and

interest. This is particularly true with regard to inducing parents to obtain proper treatment for the children who are found to have physical defects.

(2) Doctor and Nurse.—This type of work, which is the ideal form of school medical inspection, involves a division of duties. The school doctor may carry on all of the functions which he must assume when he is the sole person in charge of the health work. There has been a tendency, however, in recent years, to have the school nurse assume responsibility for early detection and exclusion from school of any children affected with any contagious disease. In many communities employing a large school health staff, the nurse has assumed practically all of the functions hitherto carried on by the school doctor, with the exception of making physical examinations.

(3) Nurses Alone.—School nursing is probably the most important part of any adequate system of school medical inspection. As has been stated, the nurse can assume practically every function which has been considered the work of the school doctor, with the exception of making physical examinations. Even here, it has been found possible for the nurses to make all of the tests of vision, hearing, and teeth, to make tentative diagnoses of the presence of adenoids and hypertrophied or diseased tonsils, to determine whether or not the child is undernourished, and, in fact, to make a preliminary diagnosis of practically every physical defect or disease except those concerned with the heart and lungs. Even in these two latter instances the objective symptoms, or those that may be readily noticed by any trained person, are often so obvious that the nurse, or even the teacher, may detect a certain proportion of the cases. Valuable as is the contribution of the nurse to the health work actually carried out in the schools, probably her most important function is that of making visits to the homes of children who have been found to have physical defects or who are in need of any kind of health care.

In New York City, before nurses were employed in school

health work, it was the common practice to send a postal-card notification to parents, informing them that their child had been found to have a certain type of physical defect. A careful investigation of the results of this method showed that approximately 6 per cent of the children received treatment after this notification. With the employment of school nurses who make visits to the homes to tell parents personally of physical defects in their children and to explain to them the need for adequate treatment, the percentage of such children receiving proper treatment almost immediately rose to 86 per cent.

(4) Teachers Alone.—When it is impossible for the community to employ either a school doctor or a school nurse, the work may be done by the teacher. She should, if possible, work in co-operation with the local physician. From him, or from the vast amount of literature which has been issued on this subject, she may learn how to detect the more obvious types of illness or physical defects and notify the parents in each such instance. She may also make sanitary surveys, sending her reports to the local school board. It is possible for her to personally readjust many unsanitary and unhygienic conditions. She may obtain and distribute various types of pamphlets on health care of children of school age, and she may and should carry on a regular system of instruction of the children on health topics.

Volunteer School Workers.—The practice of having volunteer workers connected with systems of school medical inspection has not been followed in this country except in a few isolated instances. In London there are more than 6,000 unpaid volunteer workers connected with the work of school health supervision. These workers assume many of the duties that are part of the work of the school nurse in this country. They assist the doctor when he is making physical examinations of the children. They make follow-up visits to the homes to secure treatment for the children and to see that the doctor's advice regarding hygiene is carried out. In addition, they carry on many social-welfare activities

such as holiday clubs, school savings bank, and they also act as assistants in the school lunch system. They are under the supervision of a small group of paid workers, about 120 in number, who have about the same functions, but a larger responsibility.

In this country the most notable example of such employes in this type of work is in Cleveland, Ohio, where for some years a group of women who are practically all college graduates are employed to assist the physicians and act as aids to the nurses in the work of school medical inspection. These workers are on a paid basis, but must be considered as semi-volunteers, for the salaries they receive are in no way commensurate with their training and ability. The extension of this work of volunteer or semi-volunteer assistants to school doctors or nurses is desirable. Such volunteers might serve for certain days of the week, and on part time, and would make it possible to extend the work of school medical inspection at little or no additional cost.

Budgets.—Budgets will depend upon all of the factors already discussed. Unit costs of various types of work will be influenced largely by the size of the community and the distances to be traveled between schools. In compact organizations in cities, with the school doctor caring for from 4,000 to 5,000 children and the school nurse caring for from 2,000 to 2,500 children, physical examinations may be made at an average cost of approximately ten cents each. Follow-up visits to the homes may be made at a rate of about fifteen cents for each visit. It must be emphasized that the cost of school medical inspection does not, however, depend upon the number of children cared for so much as it does upon the time consumed in visiting the schools.

In outlining a budget, consideration must be given to the amount of money that may reasonably be made available. Without deprecating in any way the value of the ideal in health control, we may as well face the fact that there are few communities who are willing to appropriate a sufficient amount of money to carry out this type of health work in

the most adequate manner. The attempt to cover wide territories and care for large numbers of children on inadequate appropriations has resulted in much inefficient and harmfully superficial work. If the appropriation is limited, it is far better to concentrate upon a few types of health work, and do them well, than to attempt to include many features and have them result in nothing except a thoroughly unreliable report.

In estimating the needs of a proper health staff for the schools, one should start with a knowledge of the number of children to be cared for, the number of schools and the distances between them. The number of children between five and fifteen years of age in any community usually amounts to about one-fifth of the total population of that community. The number of children in each school and the distances between schools will determine the number of children who can be cared for by one school doctor and one school nurse. It is an exceedingly easy matter to outline ideal budgets or to carry on satisfactory health work in any community if an appropriation to meet all possible needs can be secured. While every effort should be made through public-health education to stimulate the community to appropriate a sufficient amount of money for the health care of children, it is improbable that an appropriation sufficient to cover all of the possible activities involved in a proper system of school medical inspection will be made available. Ideal budgets, therefore, have little practical value, and all budgets are necessarily affected by the features we have spoken of. In order, however, to determine what may be done with a reasonable expenditure of money, typical budgets for communities of various sizes are suggested.

Budget for a City Having a Population of about 50,000.— In a city of 50,000 population there would be approximately 10,000 children of school age. Ninety per cent of these, or 9,000, might reasonably be expected to attend the public or other free schools. The number of schools in such a community we will estimate at fifteen, giving an average at-

tendance of 600 children to each school. This attendance will, of course, be variable, some schools having 200 to 300, others having an enrollment of about 1,000. In a city of this size, the probability is that the distances between schools will not be great. Based upon the above premises, a practical school budget for the city schools of this size would be as follows:

	Lowest	Highest
1 full-time health director at	$3,000	$5,000
2 part-time school doctors at $800 to $1,200 a year each	1,600	2,400
1 supervising nurse, full time	1,800	2,400
4 school nurses, $1,200 to $1,800 a year each	4,800	7,200
Clerical and stenographic assistants	2,400	3,600
Printing, stationery, and supplies	1,500	2,500
Total	$15,100	$23,100

In accordance with this budget, each part-time medical inspector will be expected to make physical examinations of 4,000 children each year, on a basis of twenty or twenty-one examinations on each of the 195 school days. He will be responsible for the health of 4,000 children. The chief medical school inspector or health director, whose duties will be largely administrative, will also be responsible for the health of 1,000 children and will be expected to make 1,000 physical examinations each year, or an average of five a day. Each nurse will have health supervision over 2,250 children. Such a staff, with a minimum expenditure given, should provide a fairly adequate health service. The appropriation of $15,100 for this purpose would mean a per-capita cost, based upon the population of the city, of approximately three and two-hundredths cents.

A definite statement of per-capita cost is of great advantage in obtaining an adequate budget appropriation. It would readily be seen, in this estimate, also, that the per-

capita cost, based upon the number of children under supervision, is about $1.68. The latter figure, including as it does health care for the entire school year, is certainly limited in amount. Educational costs are not easy to determine with any degree of accuracy. In cities they may run from $50 to $60 per year per pupil. In country districts the school cost will, of course, depend upon the number of children in the school, and must be estimated for each district. Based upon city costs, however, the per-capita cost of health supervision as given may be considered as a fair proportion in relation to the cost of education. The plan outlined above will allow for a visit to each school each day by either a doctor or a nurse.

Budget for Rural Community of 2,500 Population.—A community with a population of 2,500 will include approximately 500 children of school age. In such a community, covering, as it probably will, a wide area, the unit of 2,500 being taken as the basis of a rural county in a typical Middle Western state, there may be from twenty to thirty schools, the number of children in each school varying from ten to fifty. In any rural community it is usually more difficult to obtain the needed appropriation than it is in a town or city. In some of the states that have mandatory laws the rural communities have employed school doctors on a contract basis, receiving bids for this purpose and awarding the contract to the physician who will make the examinations at the lowest per-capita cost, this payment being made in place of a yearly salary. Such a method is neither economical nor productive of successful results and should be discontinued.

In a community of this type a reasonable budget may be as follows:

On the basis of these estimates, the per-capita cost for the community as a whole would be $2.00 and $2.72, respectively. This is, of course, a relatively high proportion. A marked reduction in the cost may be secured by provision for the nurses' services only. Unfortunately, rural work for child

	Lowest	Highest
1 part-time school doctor at $900 to $1,200 a year	$900	$1,200
2 school nurses, $1,200 to $1,500 a year each	2,400	3,000
Clerk	900	1,200
Printing, stationery, and supplies	200	500
Incidentals, including upkeep of car	600	900
Total	$5,000	$6,800

health is always more costly than city work. Not until such communities realize the enormous importance of keeping children well will there be adequate appropriations for this purpose.

It may be necessary to carry on extensive education of the community in order that they may comprehend the necessity for contributing at least this amount in order to conserve child health, and until we understand that child health is just as important, and probably more so, than child education, we may have to be content with more limited appropriations for this work.

Under the budget estimate as given above, the number of children under the care of the doctor would be 500 and each nurse would have supervision over 250. With the proper apportionment of duties each school could be visited by a doctor or nurse two or three times a week, and each child could be given a physical examination once each year. A reduction could be made in the budget if physical examination of the children is to take place only on entrance to school and every three years thereafter. This reduction would affect only the appropriation for the services of the school physician. At least two nurses would be needed if the proper type of school nursing supervision is to be maintained.

Administrative Procedure to be Followed.—A schedule of regular visits to the schools should be made out at the

beginning of each term and a copy given to the principal or teacher in charge of each school, thus allowing the principal or teacher to be prepared for the visits of the doctor or nurse or to reach them at other times. These schedules should be so made out that there may be no discrimination as to the time at which the school will be visited. What is known as the "stagger" system may be used, alternating early morning and late morning visits, as well as alternating the days upon which the visits are to be made. Thus School A may be visited on Monday and Thursday morning at 9 o'clock for one week, 10.30 o'clock the next week, and at the beginning of the afternoon session the third week. School B will be visited on Tuesday and Friday at 10.30 the first week, at the beginning of the afternoon session the second week, and at 9 o'clock the third week. School C would be visited on Wednesday at the beginning of the afternoon session the first week, at 9 o'clock the second week, and at 10.30 the third week. At the end of three weeks School B would take the previous schedule of School A, School C, would take the previous schedule of School B, and School A would take the previous schedule of School C. At the end of each three weeks there would be a similar readjustment of days, giving each school equal service.

Routine to be Followed.—The usual routine of school medical inspection is divided into

1. Morning inspection.
2. Routine inspection.
3. Care of emergency cases.
4. Physical examinations.
5. Follow-up visits to the homes.
6. Health teaching in the schools.
7. Sanitary surveys.

1. *Morning Inspection.*—(1) Each school should be visited at the time agreed upon. Whenever possible, a room in each school should be set apart for the use of the school doctor and nurse. Ideally, the room should be at least twenty feet long, to allow proper vision testing. In country

schools there should be at least one desk set aside for the use of the doctor and nurse, and during the time when the physical examinations are being carried on or the vision or hearing are being tested the regular school routine should cease or be greatly modified. At these visits the school doctor or nurse should see every child referred by the teacher as showing any signs or symptoms of a contagious disease. An examination of the child should be made and a culture taken in the case of any sore throat. If the presence of any contagious disease is suspected the child should be sent home at once with a printed slip informing the parents that the child is probably infected with a contagious disease and must be kept in the house until released by the local health officer. The latter should be notified immediately of the name and address of the child, and if a culture has been taken it should be sent to the health officer or to the nearest laboratory for examination and report.

(2) All children who have been absent from school for any unexplained cause should be examined before readmittance to the school or classroom.

(3) If children are found to have infectious skin or eye diseases their parents should be notified, and if at the end of twenty-four hours the necessary treatment has not been provided, the nurse should treat the children in the school, and if the treatment can be carried out persistently, the child should be allowed to remain in attendance at school. (For standardized methods of treating these diseases see Chapter XI.)

2. *Routine Inspection.*—At the beginning of each term the school doctor should make an inspection of each child in the classroom or school. Thereafter the school nurse should make a similar inspection of each child at least once each month. This examination is devised to detect cases of infectious eye or skin diseases, predominant physical defects, or early cases of illness. The nurse or doctor stands with the back to the light and the children pass in single file before them. The best way to aid quick inspection of the child is

for the latter to pull down the lower eyelids and open the mouth wide. The skin on the back of the hands and on the face may be seen at a glance. It is easy to notice whether the conjunctiva of the eye is inflamed; the condition of the tongue, gross defects of the teeth, and the condition of the tonsils may also be noted. It is possible to notice whether or not the child is undernourished or has any marked abnormal physical condition. The routine inspection, at best, is merely supplementary to the efforts by the teacher to detect this type of defect. Her constant association with the children gives her an advantage in this regard.

3. *Treatment of Cases.*—After the morning and routine inspections have been carried on, the nurse should treat in the school those cases of contagious eye and skin disease which are properly under her care. First treatments for accidents, injuries, or "first aid" may be given, but the school nurse should under no circumstances give a second treatment in such cases or treat any type of disease other than the contagious eye and skin diseases. The reason for this is obvious. If the school doctor or school nurse maintains a clinic for children in the schoolhouse, any good results that may be achieved are far counterbalanced by the drawbacks. Professional jealousy on the part of private physicians, charges that the school doctor is interfering with their practice in caring for their patients, statements that nurses are illegally practicing and treating cases of illness, are all common. In addition, the nurse may easily place herself in a position where she may be accused not only of practicing medicine without a license, but even of malpractice. Even if these criticisms could be obviated, the main harm that results is the fact that the time of the doctor or nurse is taken from his or her legitimate duties and applied to work which does not properly come within the scope of the functions of either. The school should not be made into a clinic, and the only treatment of non-contagious disease conditions that is warranted in the school is in instances where treatment must be associated with the work in the sight-

conservation classes, dental care, and the nutrition classes, with readjustment of diet. Even in all these instances the advice of the private physicians should be obtained in each case, and followed when it does not interfere with the routine of the school.

4. *Physical Examinations.*—In no other part of school medical inspection are the methods so chaotic as in the manner in which physical examinations are made. It is impossible at the present time to compare the statistics of physical defects found in the children of any one community with those found in the children of any other community. Even in one city or town the reports of one school doctor will vary widely from the reports of another school doctor examining the same children. Part of this difficulty may be laid to the fact of careless and negligent physical examinations and often to inadequate knowledge and training on the part of the physicians employed, but a larger part of the blame must rest upon the lack of any standards of the methods of examination or any standard as to the type of defect that should be noted. Some physicians will classify tonsils as enlarged or hypertrophied if they can be seen at all. Other physicians will not call attention to the need of treatment for a tonsillar condition unless the tonsils are badly diseased or so enlarged that they obstruct the child's throat. Record cards used in various communities differ widely. The extent and manner of making examinations also vary. In many communities all examinations of children are made when the child is fully clothed. Other communities are able to undress the children for examinations. In some localities the boys are undressed and the girls are not. The time taken to make an examination shows equal variation, ranging from fifty seconds to ten or even fifteen minutes.

The manner in which the examination is made is of great importance. Personal observation in a large city, which in its annual report stated that complete physical examinations were made of each school child each year, showed that these

examinations were conducted in the most superficial manner. The child stood before the doctor; the doctor glanced at him, gave a casual look into the child's throat (no tongue depressor was used), and in the majority of instances passed him on with the statement that the child was all right. In many places it is a practical impossibility to have the children undressed for examination, owing to the prejudices that exist on the part of parents against such a procedure. Children are usually undressed when taken to a physician's office for physical examination, and there is no reason why the same procedure should not be carried out in the schools. Having a nurse or teacher present at all examinations made of girls would seem to furnish the proper supervision. Experience has shown that the majority of physical defects can be detected without undressing the child, but there are certain cases of undernourishment that can be found only when the child's body is seen. A physical examination of heart and lungs, when made through heavy clothing, cannot be considered reliable. Notwithstanding the difficulty of hearing chest sound through clothing, however, the diagnoses made by many school doctors for abnormalities in the heart and lungs are surprisingly accurate. The reason is, of course, that it is not within the province of the school doctor to make a detailed diagnosis. The simple statement that a certain type of abnormality exists is all that comes within his province, the determination of the exact nature of the difficulty and the provision of appropriate treatment being left to the family physician. Under present conditions the only course open is to make the examination as thorough as possible and to make a diagnosis of the location and general character of the defect, such as a defective vision, heart disease, lung disease, and so on.

Although methods of physical examination have not been standardized throughout the country, there are certain places where a definite routine is followed. The routine procedure in New York City will be found in the appendix.

The existence of any physical or mental defect in the

child should be noted by the school doctor on the individual health record card. This form should preferably be printed on the reverse side of the school record form. In any event, it should follow the child from class to class and from school to school, and all further entries should be made upon it. Duplicate slips giving the information that is recorded on the school health record should be made, and one copy given to the nurse and the other to the parents, with the recommendation that the child be taken to the family physician or, in the event that this is not possible, to a hospital or dispensary for treatment. Re-examination of these children should be made by the school doctor after treatment has been secured, and a note entered on the school record card showing whether or not the treatment has produced the desired results. In cases of no improvement, the child should be examined again at the end of six months and a second notice sent to the parents.

School Consultations.—Whenever possible the parents should be notified to be present at the school at the time their child is given a physical examination. This affords an opportunity for the doctor to call the father's or mother's attention to the presence of physical defects and to impress upon them the importance of having them corrected. Regular school consultations with groups of parents may be held by the doctor or nurse on Saturday mornings. These afford opportunity for calling attention to individual defects as well as giving talks on health topics.

5. *Follow-up Visits to the Homes.*—During the afternoons and on Saturday mornings (if school consultations are not held at that time) the nurse should visit the homes of those children who have been found to have physical defects. She should in each case instruct the parents as to the need for treatment, referring the child in each instance to the family physician or, in case of poverty, to the nearest hospital or dispensary. These visits to the home are of the greatest importance. They offer an opportunity for readjustment of the home hygiene, correction of any unsanitary

conditions, and provision of a proper health routine for the child. Casual and hurried visits are of little value. They may in certain instances induce proper medical or surgical care for the child, but unless all of the other matters pertaining to home and child hygiene are properly adjusted, they will be of little, if any, practical benefit. Such home visits require tact, common sense, and perseverance. Whatever the nurse's professional training may have been, she will be a failure unless she possesses these three attributes. The first visit to the home may often be nothing more than a social call, and possibly it may require two or three visits before the confidence of the parents has been won and the nurse is able to take up with any effectiveness the matter of the readjustment of the child's life and the provision of proper treatment. Printed leaflets on health topics are of some value. The results from their use, however, only too often prove disappointing. The spoken word and the intimate sympathy and understanding of the right human contact which may be established by the proper type of school nurse will do more than all the health leaflets that have ever been printed.

The number of visits required to obtain treatment of the child and for the readjustment of his home hygiene vary greatly. With co-operative parents it is possible to obtain the right kind of care for the child as the result of one or two visits. In other instances, where the parents are ignorant or neglectful, it may be necessary to visit the home at regular intervals for many months. There is too great tendency on the part of many administrative officials of school-health programs to demand quantitative results. Nurses are frequently held responsible for making a certain number of home visits each day. This is a deplorable attitude with regard to this important matter. If a nurse makes one home visit a day, readjusts a child's life so that he may live in a healthful manner, and obtains for him the right type of health conditions that are needed, it is far more commendable than if she makes twenty visits to leave printed leaflets

or to enter certain statements on her records. Perfunctory, slovenly or hurried work will never produce the desired results. The same criticism holds good with regard to the work of the school doctors, but if his diagnoses are not accurate, the mere fact that attention has been called to the necessity of treatment for the child nullifies his negligence to a great degree. Similar carelessness or negligence on the part of the nurse is not so easily remedied. The responsibility for the health of the child rests upon her, and the level of efficiency in any type of school medical inspection will rise no higher than that of the ability and interest of the nurse and the success of her efforts.

When parents are willing to have their children treated, but are unable to take them to a dispensary or hospital for this purpose, it is a proper part of the nurse's duties to go with the children and see that treatment is secured. In no instance should this be done, however, without a written "consent card" or request card signed by the parents. In those states where the father is legally responsible for the child his signature should appear on the card. If the mother is given legal responsibility, her signature will be sufficient. Neglect to observe this simple precaution may result in civil suits for negligence or malpractice being brought against the individual nurse or the school or the health board. It is illegal in practically every community for any operation, inoculation, vaccination, or any other type of medical treatment to be given to a minor without the consent of the parents. In making visits to dispensaries the nurse may well set aside one or two afternoons for this purpose, taking the children in groups that may easily be cared for, and thus obtaining the needed medical or surgical care for a considerable number of children within a limited time.

6. *Health Teaching in the Schools.*—Health teaching in the schools may well be the province of either the school doctor, the school nurse, or the teacher. Many states require a definite course of hygiene as a part of the school curriculum. Formal teaching of this nature has not been a

success. The modern attitude toward the teaching of health is to enlist the co-operation of the child. To do this, the subject matter must be made so attractive that the child is immediately interested and applies the health teaching in his own life. There are many interesting books and pamphlets which have been written on this subject. Among the most notable contributions are those of the American Child Health Association, through its Division of Health Education. The literature of the association on this subject is freely distributed and available to any one. An excellent book, entitled *Health Training in the School,* which is a handbook for teachers and health workers, has been written for the New York City Tuberculosis Association by Theresa Dansdill. It is exceedingly comprehensive and may well serve as a text-book for an entire course on health training. Some states and cities have prepared complete outlines for the practical teaching of health to school children. The syllabus of the Board of Education of New York City on hygiene for elementary schools is one of the best.

The purpose of all health teaching to children is to make the presentation attractive, the subject matter easy to understand, and to arouse the child's interest. This work has been noticeably stimulated within the past five years by the methods of health education carried on by the American Child Health Association, the National Tuberculosis Association, the National Child Welfare Association, and many other national organizations. The Bureau of Education of the Department of the Interior, Washington, D. C., publishes an excellent series of pamphlets of this type. Health plays, health games, health pageants, and many other types of health activities in which the children can take an active part are commonly used. In fact, the attitude toward the methods of health teaching of children has been completely revolutionized. Health leagues, employing the competitive health idea in classes, have been a great success. In these, one child in each classroom is appointed health officer for a week or month. It is the health officer's duty to gain

the co-operation of the class in observing all the rules of school sanitation and hygiene and to instill a spirit of co-operation in the individual children in voluntarily obtaining treatment for any physical defects that may exist. Classroom charts, showing gains or losses in weight for each child and for the class as a whole, with individual weight cards to be kept by each child, on which the result of the regular monthly weighing can be recorded, are all of great value. The scoring of each class on a basis of 100 for perfect should be carried out each week or month by the school doctor or nurse. Such a score should definitely include the various factors of class hygiene, health routine, and the physical status of the children. A health banner which may be awarded each week to the class showing the highest score stimulates the spirit of class competition.

Individual health record cards, modeled on those in use in Philadelphia, Mommouth County (New Jersey), and other places, have been found practical and helpful. These cards include a *home report to the school* and a *school report to the home*. Under the home report to the school, space is given so that the parents may check up each month the following items:

(1) the child's sleeping time, and whether he has slept in a room with proper ventilation;
(2) whether the child has a regular bowel movement each day;
(3) whether the parents have given the child each day, at regular meal hours, at least one green vegetable, one cooked meat;
(4) whether the parents have given the child milk every day and have not allowed him to have tea, coffee, or indigestible food;
(5) whether the child has brushed his teeth twice a day and had at least one full bath each week.

Under the school report to the home is given for each month the following information:

(1) whether the child was clean at the time of morning inspection;
(2) statement as to the child's co-operation in the setting-up exercises, in play time and athletics;
(3) the class rating in the child's responsiveness to health instruction;
(4) the hygienic habits of the child in school, such as covering the mouth when coughing, use of a clean handkerchief, care in his personal habits, and cleanliness and co-operation in keeping the school building and classroom clean;
(5) the child's accurate weight and also the standard weight and height, calling attention if the child is 10 per cent underweight or 15 per cent overweight.

Many other items may be entered and such a card be made small enough so that it is easily carried in an ordinary envelope, and so arranged that one card will last the entire school year. It should be sent to the parents each month, with the child's school record for that month, and the teacher should co-operate in getting the parents to fill out the home record and in returning the card to school. Excellent co-operation between the home and the school is easily provided by this method.

7. *Sanitary Survey.*—At the beginning of each term the school doctor, the school nurse, or the teacher should make a sanitary survey of the school grounds, buildings, and classrooms. A special questionnaire covering each item should be provided for this purpose. The report of the survey should be referred to the school board, to the school trustees, or to other proper authorities. While the construction of the school building and many of the unsanitary features cannot be corrected by the individual initiative on the part of the school doctor or nurse or teacher, it is well within the province of each to readjust matters pertaining to the hygiene of the classroom, and such adjustment should be part of any proper administrative program.

CHAPTER XI

THE CHILD OF SCHOOL AGE

School Sanitation and Hygiene

In the United States the education of children is compulsory. The state assumes the right to take the child from his home for a certain number of hours each day for the greater part of the year. During that time the parents have no direct control over the welfare of their children. It would seem axiomatic that the state, having made education of children compulsory, should be required to provide for the child, during the time that he is in school, conditions that will not be detrimental to health, but that will promote health and well-being. Many states have recognized this responsibility by passing laws outlining in detail the standards required in school sanitation. The legal requirements in this regard in Indiana and Ohio may be mentioned as being particularly comprehensive and effective. The Council on Health and School Inspection of the American Medical Association has adopted standards of minimum sanitary requirements for rural schools. These, however, are suggestive only, and are not yet in common use.

As a general rule, the sanitary and hygienic conditions of the school buildings in our larger cities are excellent. There are, of course, exceptions to this rule, and there is hardly a town in the United States that is not still conducting classes in one or more schoolhouses that are insanitary, overcrowded, and unfit for use as school buildings. The problem of school sanitation is one that pertains mainly to the rural schools. Over 60 per cent of all the children of school age in the United States attend rural schools. The percentage of

physical defects among these children is higher than it is among the city school children, and figures of the physical condition of the men who were drafted during the World War showed that the number of young men physically defective or in need of medical attention was from 7 per cent to 20 per cent higher among those coming from rural districts than it was among those who had lived in cities. The committee of the National Education Association has made the statement that "rural school children are less healthy and are handicapped by more physical defects than are the children of the cities, including even the children of the slums." To substantiate this statement, a health survey showing the relative proportion of physical defects as occurring in country and city school children was made several years ago by Dr. Thomas D. Wood, and there is no evidence to show that the conditions have changed since then. Doctor Wood stated that of 287,469 children examined in New York City, 72 per cent were found to have one or more physical defects, while a similar study made of 294,427 children in 1,831 rural districts in Pennsylvania showed that 75 per cent had physical defects. Further reference to this relation between the occurrence of physical defects in city and country children will be made later when discussing the prevalence of physical defects among school children.

Surveys.—Surveys of the sanitary conditions of rural school buildings have been made by the United States Public Health Service, which has published many reports relating to the conditions found in varying communities, notably those of the south. The most common sanitary requirements, including privies and water supply, and even the minimum standards of decency in the schoolhouse itself, were found to be noticeably lacking. It is probable that surveys made in any state in the Union would show similar, even if not as extensive, insanitary conditions of the schoolhouses. Data upon this point are not readily available. Comprehensive surveys to determine health conditions in the schools have been made in New York State by the "Commit-

tee of Twenty-one" appointed to represent the state, and by the New York League of Women Voters. It may reasonably be supposed that New York State is not unique with regard to the condition of its school buildings. Indeed, it might also be reasonable to suppose that its standards in this respect might be higher than those that are maintained in certain other states, yet figures compiled by the New York State Department of Education show that there are 885 rural schools in the state with an average attendance of less than five pupils, and 3,015 schools with an average attendance of less than ten pupils. Of the 10,236 rural schools in the state, 8,600 are situated in one-room buildings. Fifty-four per cent were built over fifty years ago and 13 per cent are at least seventy-five years old. The temperature maintained in these buildings during the winter ranges from 40° to 90° F. Proper ventilation is practically unknown. Many windows are nailed down for the winter. Twenty-three per cent of the rural schools inspected in the survey made by the New York League of Women Voters, had no water supply, and water was obtained from neighborhood wells, springs, or brooks. One school with twenty-two pupils had no water nearer than a quarter of a mile, and another school, with eleven pupils, had no water supply nearer than a half mile. Fifty-five per cent of these rural schools still have outdoor privies of the soil-polluting type. Space does not permit a recital of all of the insanitary and unhygienic conditions found, but it may be said that the best county in the state—as far as school sanitary conditions were concerned—had only 25 per cent of its schools measuring up to the minimum sanitary conditions required for health.

The relation of the sanitary and hygienic conditions of schools to the health of the children would seem to be obvious. As has been stated by Terman, "the ultimate survival of an organism is threatened whenever it is subjected to conditions of environment widely different from those which directed its evolution. We have taken the child out of its natural habitat of open air, freedom, and sunshine, and for

nearly half his waking hours we are subjecting him to an unnatural regimen; one which disturbs all the vital functions of secretion, excretion, digestion, circulation, respiration and nutrition."

Lack of proper ventilation, overcrowding, and close contact in the classroom may be held responsible for the easy spread of infection, for the lowering of physical vitality, the disturbance of the proper process of bodily nutrition, the lowering of physical resistance, and the easy occurrence of respiratory diseases. Inadequate or faulty lighting, wrongly placed or cloudy blackboards, and poorly printed school books, with too small type, are all responsible for definite injury to vision. Too small or too large or improperly adjusted school desks and chairs lead to bad posture and often to definite spinal curvature. Lack of cleanliness and the presence of irritating dust, particularly that from the blackboards, are predisposing causes toward the occurrence of respiratory affections and possibly tuberculosis. Impure water and soil-polluting privies leave a record of typhoid fever and hookworm disease.

In so far as lack of proper sanitation and proper hygiene are concerned, an indictment may be rendered against a vast proportion of the schoolhouses in this country. If the welfare of the people is the supreme responsibility of the state—and this is a dictum that holds in common law everywhere—then certainly no state has a right to allow any child to be confined at any time in a building whose condition violates the minimum standards of decency and in which are combined practically all of the factors which react unfavorably on health. The least that any community can do for its children is to provide decent schoolhouses. No amount of health supervision of the child or readjustment of home conditions can be truly effective so long as we permit insanitary and unhygienic conditions in the school. Health teaching under such circumstances must necessarily be by precept rather than by example. The only way in which

health teaching can be effective is by living health. The school should set the first example in this regard.

The responsibility for the present condition of our rural schoolhouses rests upon the government of the various states, and to even a greater degree on local boards of education or local groups of school trustees. It is not probable that we will have better school conditions or improved sanitation and hygiene until the "small district system" is done away with. The small school having from one to ten pupils is an anachronism, both from an educational and from a health point of view. The tendency at the present time is toward consolidation of the school districts, with proper conveyance provided for the children to and from their homes to the school. The pressure of educational authorities to provide better teaching facilities has given the greatest impetus to this movement. As a by-product we shall have better health conditions. Even with all the publicity and efforts that are now being carried on to forward the consolidation of the small school districts, it is not probable that there will be any definite change in this regard for many years to come. At the present time whatever improvements take place will have to come as the result of direct action on the part of each community.

At the beginning of each term the school doctor or nurse should make a sanitary survey of the entire school building. This survey should cover all of the points that have been mentioned in our consideration of the sanitation of the school building and the classrooms. Any deviation from proper sanitary and hygienic standards should be reported to the proper officials, and resurveys made to determine whether or not wrong conditions have been corrected. The teacher of each classroom should be furnished with a copy of the survey and asked to check up on each item at least once each month, reporting to the school doctor any deviation from the proper standard. Such surveys may be as elaborate or as simple as the extent and requirements of the school building may indicate. The present insanitary condition of the

greater proportion of our school buildings is a matter that needs immediate and drastic attention. This insanitary condition is not only common in the rural schools, where it probably may be observed at its worst, but has been found to be so universal in city schools of the older type that no community can afford to disregard its significance nor fail to make provision for the correction of whatever shortcomings there may be.

The effect of proper sanitary and hygenic maintenance of classrooms on the health of children can no longer be disregarded. If education is to be compulsory, the least the state can do is to furnish the child a safe and decent place in which to spend those hours when it is under the nominal control of the state. Probably the only way in which our schools will be maintained in a sanitary and hygienic condition is through the force of public opinion. There is no greater opportunity in the whole field of child hygiene for the exercise of enlightened group consciousness than with regard to improvement of the sanitation of the schoolhouses of this country. Responsibility rests upon every citizen in every community. Chambers of commerce, merchants' associations, civic and social organizations, and individual citizens should consider this as an opportunity for constructive work. In school hygiene and health care of the school children, standards will be no higher than the community demands. This is true in all health work for children, and until each citizen individually and citizens as a group realize that the health of the babies and children of their community rests squarely upon their attitude, no amount of effort on the part of health educators, teachers, and public-health officials can achieve the desired results.

Location.—In cities, the location of a school building is determined largely by local needs and by available locations and space. In rural communities, location is also determined by accessibility, but a far wider choice of sites is possible. School architects are planning modern school buildings with direct reference to their proper sanitation and

hygiene. The rural school is in nearly all cases a makeshift affair, although in certain parts of the country, notably the West and Midwest, the type of architecture and sanitation of rural schoolhouses is being placed upon a very high plane. School buildings should be placed on ground that has possibilities of good drainage. The rural school should always have a damp-proof basement which may be properly ventilated. If this is not possible, the foundation of the small school building should be closed in and provided with screened openings. The method that is common in some parts of the country, of building schoolhouses on pillars or supports, should not be permitted. This method allows the air to sweep under the floor, causing draughts and much physical discomfort. Incidentally, it adds much to the cost of heating the building.

Orientation of School Buildings.—All school buildings should be so constructed that the lighting of the classrooms may be adequate and without undue glare. Each classroom should have sunlight at some time of the day. The best results are achieved when the classrooms face east and west, or southeast and northwest, or southwest and northeast. Such orientation provides for the sunlight entering the classroom either in the early morning hours or in the late afternoon hours. A northern exposure which precludes any amount of sunshine, or a southern exposure, which would admit the sunlight for the greater part of the day, should be avoided.

Fire Protection.—The hazards incident to fire in the school building are mainly those of large schools. The one-room school affords such an opportunity for the children leaving within a very short space of time that the fire risk cannot be considered as of marked importance. In cities, local regulations usually determine fireproof construction for school buildings. In all school buildings, whether city or rural, the doors should open outward. There should be broad corridors, and if the building is of more than one story there should be either an outside, inclosed staircase

or an inside staircase, built of concrete so as to render it fireproof. Forty-four and five-tenths per cent of all the rural school buildings in the country are one-story frame structures, with little fire hazard except as to possible property loss. Protection from the risk of fire is so universally required by law at the present time that this protection, combined with adequate fire drills, affords a certain measure of safety for the children. There is a tendency, however, for the citizens of any community to feel secure because adequate fire-protection laws have been passed. The existence of these laws, does not always mean that they are properly enforced. Proper surveys to determine the extent of protection from fire that is afforded in the construction and management of school buildings, and the efficiency of the fire drills, should be carried out at least once each term.

Drainage, Water Supply, and Privies.—All of these matters are of concern mainly with reference to the rural of water supply and drainage that is available to the entire schools. In the cities the schools have usually the same type community. In city schools, however, the question of toilets is a matter that deserves consideration. There should be provision of one toilet for each forty girls or boys, with an addition of one urinal for each forty boys. Although many of our city schools are equipped with the best type of toilets, their constant use frequently causes them to be left in filthy condition. The use of the horseshoe, or "U"-shaped, toilet seat is advised both for the sake of cleanliness and in order to prevent any possible transmission of gonorrhœal vaginitis. In rural schools the location of the privy is closely connected with the question of drainage and the source of water supply. The greater proportion of rural schools receive their water from shallow wells. These are not infrequently placed where the water is constantly contaminated because of the drainage from the privy. Such contamination can be obviated by the installation of sanitary privies. In the absence of any sewage-disposal system, chemical closets may be placed in rooms opening into the

schoolroom, or if the outdoor privy is essential, it should be of the covered-pail type. Plans for building these privies may be obtained from the United States Public Health Service. The shallow well should be protected from surface drainage and in every case it should be located as far as possible from any source of contamination.

Hygiene of the School Building.—The hygiene of the school building is mainly important as it relates to classroom construction and maintenance, and will be considered from that point of view.

Size of the Classroom.—The size of the classroom is of importance. Many tests have been made to determine the ideal length, width, and height. These have been based, as far as length is concerned, on the carrying capacity of the teacher's voice and the ability of the child to see and hear. Many tests have shown that the limit of these factors is about twenty-nine feet. If an additional three feet is allowed for space back of desks and aisle room, the length of the ideal classroom may be placed at thirty-two feet. The width of the classroom will depend upon the lighting. When this is provided from one side, and the window space is equal to a minimum of one-fifth (or preferably one-fourth) of the floor space, and if the windows are properly placed so that they reach to within six inches of the ceiling, a proper amount of light for classroom use will be transmitted to a distance of twice the height of the top of the windows from the floor. The height of the room is arbitrarily placed at from twelve and one-half to thirteen feet. Rooms lower or higher than this interfere with proper ventilation and lighting. If, therefore, the windows reach to within six inches of the ceiling, they will be twelve feet from the floor, and twice that distance equals twenty-four feet, which will be the width of the classroom. Such a room, therefore, measuring thirty-two by twenty-four feet and twelve and one-half feet in height, may be considered as standard. The number of children that may be cared for in such a room must be determined by the adequacy of the ventilation.

Classroom Walls.—All walls should be painted or tinted. Oil paint is best, and the finish should be without gloss. The colors that have been found to give the best reflection coefficient are light tan or a soft shade of light green. In order that the light may not be reflected from the walls on a level with the eyes of the children, the walls should be painted a darker color to a height of about four or five feet from the floor level. Floors should be of hard wood and kept oiled to reduce the amount of dust. Many state laws require the oiling of classroom floors at least twice a year. Windows should be properly protected by shades. If the classrooms face east or west or north, tan window shades are advised; if exposure is toward the south, green shades are preferable.

Blackboards.—Blackboards should be placed directly in the line of vision of the child and should not be subject to any cross light. They should not be placed between windows. Blackboards may be made of clear black slate or black or dark-green composition material. They should be washed thoroughly each day and never allowed to become gray or dull. Unclean blackboards strain the vision of the child. The dust from the crayons or erasers may be extremely irritating and has been found, in some instances, to be responsible for the occurrence of respiratory diseases and for increasing the susceptibility to tuberculosis.

Desks and Seats.—The best type of school desks are those which are movable and which are adjustable to the child's height. The main considerations to be observed in school desks and seats are that the seat should be of proper height and size for the individual pupil; the desk top should be adjustable, so that the proper slope may be maintained, and the chairs should be so constructed as to allow the child to sit in an upright position with his feet resting firmly on the floor and his back given the proper amount of support. There are on the market a large number of school chairs which meet the essential requirements. The fire laws of many communities, however, prohibit the use of movable

chairs, fearing that, in case of fire, ready egress from the school room would not be possible unless free space in the aisles of the room is always maintained.

Modern schools are generally equipped with adjustable school furniture. The difficulty seems to be that, although the desks are adjustable, they are not often adjusted. Spinal curvature and other postural defects, and defective vision, may be the result of improper school seating. The desks and seats should be adjusted at least once each term to the needs of the child. The seat of the chair should be at such a height that the child's feet will rest squarely on the floor when the legs are flexed at right angles. The depth of the seat should be two-thirds the length of the thigh. The back of the seat should fit the child so that he will not stoop or assume a slouchy posture. The top of the desk should be adjustable with regard to its slope, which may vary from fifteen degrees for writing to thirty or forty-five degrees for reading. The level of the top of the desk should be far enough above the seat so that the child can rest his forearms comfortably upon it while maintaining his body in an upright position. The relation of the front edge of the seat to the rear edge of the desk is usually recorded as plus, minus, or zero. Plus means that the rear edge of the desk overlaps the front edge of the seat, minus means that the rear edge of the desk does not reach the front edge of the seat, and zero is when they are exactly in the same line. The best adjustment is to have about one inch plus; that is, the rear edge of the desk overlapping the front edge of the seat by about one inch. The height of the desk should be three-sevenths the height of the child; the height of the seat two-sevenths the height of the child, and the distance from the seat to the top of the desk should equal about one-sixth of the child's height.

An easy way to provide for proper adjustment of the desks and chairs is to have it done by one or two of the older boys or girls who have some mechanical ability. On a stated day, at the beginning of each term, each child in the class-

room should have his or her height measured on the blackboard. This may be done by some of the other pupils. The teacher can then compute the proper height of the desks and seats to fit the individual children. Usually a screw driver and possibly a wrench are all the tools necessary to effect the adjustment, and this may readily be accomplished for the ordinary class within an hour or two.

School Books.—All school books should be printed on unglazed paper. For the older grades, type known as long primer may be used. Small pica is larger and better. For younger children pica type is necessary and great primer type is advised for the first reading books. The essentials for easy reading depend not only upon the quality of paper and the size of the type, but also on the length of the line and the distance between lines. It has been found that there is undue strain upon the eyes if the line of type is longer than 80 to 90 mm., or 3⅛ to 3½ inches. With lines of this length the eye travels readily from side to side and the tendency toward eyestrain is eliminated. The distance between the lines should not be less than 3 mm., or ⅛ inch. An open space between the lines does much to rest the eye, and crowding together of lines on the printed page is a definite cause of eyestrain.

Cloakrooms and Lockers.—If at all possible, each classroom should be provided with its own cloakroom or lockers. In either case they must be built so as to allow free ventilation. Individual lockers afford a method for the proper care of the child's outdoor clothing, but their construction is somewhat costly, and if they cannot be provided, well ventilated and airy cloakrooms will be found to serve the purpose, provided the hooks to hold the clothing are placed at such intervals that the clothing of one child does not come into contact with that of any other child. To eliminate fire hazards, due to having the closet space connected with classrooms, two doors should be provided, one opening from the closet into the classroom and the other opening from the public hall into the closet. These two openings not only

afford an opportunity for proper ventilation, but also a means of egress from the classroom which may be used in addition to the regular classroom door when quick dismissal is necessary.

Classroom Ventilation.—Consideration of this subject must take into account the heating of the classroom, and it is also closely related to the subject of proper lighting. There is probably no one part of the entire question of hygiene of the school building that has such an important relation to the health of the child as the matter of proper ventilation. There are many opinions on this subject, and there is still a certain measure of difference between the attitude of those who advocate mechanical systems of ventilation as proper and satisfactory for classroom use, and those who advocate ventilation by means of open windows. In the attached bibliography reference is made to several books, pamphlets, and articles which have been written on this subject. No attempt has been made to cover the entire literature, which is exhaustive and in a certain sense controversial. There can be little doubt that the interest taken in this matter by school hygienists has modified the previously accepted dicta on this question. The tendency in recent years has been for the school hygienists to ask for more direct means of ventilation, and large numbers of them are outspoken advocates of the open-window system.

The sanitary engineers, as a class, feel that the problem of proper ventilation is almost essentially a mechanical one and that it is possible to deliver to any classroom, or other room, the required amount of air of a proper degree of "freshness," temperature, and moisture. Possibly the reasons for this difference of opinion rest upon two main factors: (1) the school hygienist is in more intimate contact with the children and is thus able to observe not only the manner in which any mechanical system of ventilation works, but also the effect of adequate ventilation or lack of it upon the health of the child. (2) Mechanical systems of ventilation, no matter how perfect they may be in their conception and

construction, are dependent for their full efficiency upon the manner in which they are maintained. The maintenance of these systems is usually left to the custodian of the building, whether he be superintendent or janitor. It is unfortunately true that in a great number of instances the maintenance of these systems is imperfect and unsatisfactory. While they may be capable of supplying the required amount of air at the proper degree of temperature and moisture, practical experience has shown that this promise is not often lived up to. When there is failure of the mechanical system to act, the condition reacts seriously upon the health of the children, because the regulations of nearly all schools employing mechanical systems require that classroom windows shall be kept closed.

Possibly the most comprehensive consideration of the question of classroom ventilation is that comprised in a report of the New York State Commission on Ventilation in a book entitled *Ventilation.* Here several chapters are devoted to this subject and are written as the result of numerous experimental studies carried out to determine the relative efficiency, from a health point of view, of mechanical and open-window ventilating systems. The following conclusions were reached as a result of studies made in a series of schoolrooms in New York during the winter of 1915-16:

1. Schoolrooms ventilated by windows alone, without gravity exhaust ducts, are likely to be imperfectly aërated and malodorous.

2. Schoolrooms ventilated by windows without special deflectors and by gravity exhausts are much better than those which lack exhaust ducts.

3. Schoolrooms provided with certain types of window deflectors, with radiators located beneath the windows and with exhaust ducts, may be ventilated throughout the winter season with entire success. Under many circumstances this may be accomplished without the use of fans and with the maintenance of agreeable conditions satisfactory to teachers and expert observers. In judging the results of these experiments it should be noted, however, that the practical experience of members of the commission has suggested that proper dampering is essential to avoid back draughts. In some cases the installation

of exhaust fans may be desirable in order to maintain a positive exhaust, especially during the period of milder weather and when the wind pressure is slight or in an unfavorable direction; such fans should, however, be designed to produce only a slight air flow or the special virtues of the window system may be lost.

4. Window deflectors composed of parallel curved plates are somewhat superior to those of the simple plate-glass type. The plate-glass deflector should be of ample height.

Another study of the comparative merits of mechanical and open window ventilation was made by the commission during the winter of 1916-17. This was also carried on in certain New York City schools. The summary of this study was as follows:

1. The window rooms are slightly but distinctly preferred by a group of high-school girls, who judged the question purely on their bodily sensations uninfluenced by prejudice or by varied stimulations, sight of open windows, personal associations, etc. The window rooms were criticized as too cool more often than the fan rooms, but the fan rooms were more often pronounced malodorous and stuffy, too warm and yet too draughty.

2. Both "freshness" of the air (the term being contrasted with the presence of odor in our voting chart) and absence of "stuffiness" are associated with low room temperature; while general "comfort" is closely correlated with the absence of the sensation of being "too cool" or "too warm."

3. The reason for this preference seems to be largely a thermal one. The window rooms were comfortable because they were cooler, for, even though there was little difference in temperature as measured three feet from the floor, yet between this level and the floor the window rooms were distinctly lower in temperature.

4. The kata-thermometer indicated that the fan rooms extracted more heat from the body and in this sense that they are more cooling than the window rooms. Inasmuch as the window rooms were preferred, it appears that coolness due to low temperature and relatively slight air movement is preferable to coolness produced by air motion in the presence of higher temperature.

5. Aside from the question of temperature at the three-foot level or the floor level, there appears to be an unmistakable preference for the window-ventilated room.

There are several differences in the mode of heat loss from the body in the two types of rooms which may help to explain the sensation votes recorded. In the first place, the window rooms show greater

differences between the temperature at the floor and at the three-foot level. It is conceivable, though not probable, that such a condition is agreeable. In the second place, heat loss in the window rooms by radiation and conduction is relatively greater, heat loss by convection relatively less. The nose and throat are thus bathed in cooler air and the rate of heat loss from the clothed body as compared with the unprotected face must be relatively greater. This may very probably be a condition favoring comfort. In the third place, the fact that the air movement in the case of the window rooms is more variable from moment to moment may be a factor which plays a part by producing a pleasant sensation of breeze without causing draughts.

That a real superiority exists, however, appears to be certain.

The two studies quoted above were carried on, first from the point of view of actual statistical results obtained, and second, from the point of view of the comfort and opinion of the children in the classrooms that were studied.

A third investigation was made under my direction in co-operation with the New York State Commission on Ventilation, and was carried on in two groups of schools in New York City during two school years. The first of these co-operative studies was conducted during the months of February, March, and April, 1916, and the second during November and December, 1916, and January, 1917. The results of these two studies were analyzed separately and then together.

The first study covered a period of eight weeks and included 2,500 children distributed in 58 classrooms in 8 schools. The second study covered 12 weeks, included 3,000 children distributed in 76 classrooms in 12 schools. Three types of classrooms were selected for the purposes of the study: (a) 68 degrees mechanical ventilation, (b) 68 degrees open-window ventilation, and (c) 50 degrees open-window ventilation. Any conflicting factors involving race, social condition, or age were eliminated by having the same types of children in the three different types of classrooms. The commission selected the rooms that were to be mechanically ventilated, and it was required that the ventilating system be in good working order and that the janitorial service

could be relied upon. A sufficient force of doctors and nurses was assigned by the Bureau of Child Hygiene of the Department of Health to supervise the health part of the study.

In order to determine the effect of ventilation of classrooms on the health of school children it was felt necessary to take some one determining factor upon which the study could be focused. It seemed reasonable to believe that the occurrence of respiratory diseases was the condition most easily influenced by the type of ventilation, therefore the study was made for the purpose of determining the effect of classroom ventilation upon the occurrence of respiratory diseases in children. A full consideration and analysis of this study is given in the volume on *Ventilation* that has already been referred to. The conclusions drawn as a result of the data obtained from this study were as follows:

1. In the closed-window, mechanically ventilated type of classroom kept at a temperature of about 68° F. the rate of absences from respiratory diseases was 32 per cent higher than in the open-window, naturally ventilated type of classroom kept at the same temperature (about 68° F.) and about 40 per cent higher than in the open-window, naturally ventilated type of classroom kept at a temperature of about 50° F.

2. In the closed-window, mechanically ventilated type of classroom kept at a temperature of about 68° F. the rate of respiratory diseases occurring among pupils in attendance was 98 per cent higher than in the open-window, naturally ventilated type of classroom kept at the same temperature (about 68° F.) and about 70 per cent higher than in the open-window, naturally ventilated type of classroom kept at a temperature of about 50°.

3. It was found in this investigation that the relative humidity of classrooms, whether ventilated by natural or mechanical means, was not a causative factor in the occurrence of respiratory illness among school children.

To summarize again, it was found in this investigation that children in classrooms with closed windows, ventilated by mechanical methods, were more subject to respiratory diseases of slight or serious character than those children who were kept in classrooms ventilated wholly by open windows.

The New York State Commission on Ventilation comments upon this study as follows:

There are indications that something inherent in the method of ventilating schoolrooms by means of forced draught and gravity exhaust, as practiced in this study, is productive of respiratory affections to an extent not present in rooms ventilated with windows and gravity exhaust. What the unfavorable elements are is not entirely clear. Higher temperature is undoubtedly the main factor. Another is the greater uniformity of temperature and air flow, characteristic of the fan rooms. Too great uniformity perhaps removes a desirable stimulating effect which exists when temperature and air movement fluctuate as in the window rooms. . . . It must not be inferred that window ventilation, as represented in this study, was uniformly satisfactory. It was not. As a rule, rooms exposed on the east do not fare as well as others. Ample exhaust openings are better than those of small area. The location of outlets with respect to the windows, location, size, the type of heating system and control of direct radiation, window deflectors, etc., affect the success of this method. Yet, in spite of our inadequate knowledge of window ventilation at its best, the fact remains that the window rooms of this study, even though of crude arrangement and not built originally for this purpose, competed on favorable terms from a hygienic and esthetic standpoint with the more elaborate and costly fan and duct equipment. The tendency in the past twenty years has been away from natural and toward mechanical ventilation. The time and effort of the heating and ventilating engineer have been directed toward the perfecting of mechanical means for aërating buildings. It is possible that the same amount of effort, if expended on the development of window ventilation, would yield results of great value.

Because window ventilation is practical for the ordinary schoolroom, it does not follow, of course, that the assembly room, the theater, and other places seating, in certain cases, many people, can also be dealt with in the same manner. Each type of inclosure must be handled as a distinct problem. Natural ventilation has its limitations. That the schoolroom is not beyond these limitations is indicated by this study.

One of the objections made to the use of the open-window system of ventilation is the added expense caused by increased heating essential to keeping these classrooms at the required temperature, owing to loss of heat through the open windows. At first sight this argument would seem to have value, certainly, from the point of view of the sanitary

engineer, but from the point of view of the school hygienist the cost can hardly be considered as weighing in the balance against the health of the children concerned. It has been estimated that in the construction of a new school building of modern type the cost of the ventilating and heating systems amounts to 15 per cent of the total cost of construction of the school. It has also been estimated that by eliminating that part of the cost which relates wholly to the system of ventilation, the amount of money saved would pay for the extra supply of coal needed to maintain a proper temperature in the open-window classrooms for a period of approximately twenty years. The question of added cost of heating, therefore, need not be considered as an argument against the open-window method of ventilation.

The consideration of ventilation of classrooms that has been given above has not included any mention of the different types of ventilating systems. These are mainly dependent upon the fan and exhaust, or plenum, methods. Successful open-window ventilation is also dependent to a certain extent upon the type of window deflectors used and in some cases by the added use of an exhaust system. The object in this discussion has been to consider merely the general problem of the relation of classroom ventilation to the health of the school child. From the clinical point of view, all school hygienists are agreed upon the merits of the open-air classroom for undernourished children, or those who have been exposed to or who are susceptible to tuberculosis. Children with cardiac diseases have also shown noticeable improvement when placed in the open-air classrooms. Clinical experience is abundant as to the relation between fresh air and the improved health of children. It has been a common practice to use the open-air treatment in the care as well as the prevention of tuberculosis, both in adults and in children. There is a certain inconsistency in our attitude with regard to open-air classrooms in schools. We are justifiably proud of the improved health of children from the time they are given the advantage of this outdoor life, but it

seems illogical to congratulate ourselves on any procedure of this kind while denying similar advantages to all of the children who are in attendance at school. If the open-air classroom is an essential requirement to conserve and improve the health of any one group of children, it would seem equally essential for the prevention of disease and the conservation of the health of all children. In a certain sense, open-air classrooms are an indictment of our whole school health program. While they may be considered as absolutely essential for certain types of children, this is no adequate reason for excusing ourselves for not giving the same facilities to all children. The Elizabeth McCormick Memorial Foundation in Chicago, which for many years maintained open-air classrooms in the Chicago public schools, had at one time a poster showing a little boy applying for admittance to an open-air class, and looking up to the teacher with pathetic appeal, as he asked, "Say, mister, how sick do I have to be to get into this classroom?"

There are only too many instances where our classrooms are incubators of disease and where we permit the disease to go on to the point of complete manifestation before we remove the child to an open-air classroom, and then pride ourselves on the improvement in health that takes place. Whatever our preference may be be as to the type of ventilation that should be employed, it remains certain that we shall not have done our full duty toward the matter of preservation of the health of the children in our schools until every classroom is adequately and completely ventilated, whether by mechanical systems or by the use of open windows. The cheapest and most practical method is the use of the open window. If mechanical systems obtained the same results, as far as health is concerned, there would seem to be no objection to their use. As a matter of practical experience, they do not.

A full consideration should be given this subject whenever the question of construction of a school building is being considered. In already existing schools, the open-

window classroom offers direct means toward improved health. Instead of a school with twenty mechanically ventilated classrooms and one open-air classroom, always inadequate to care for the number of children who should be admitted, why should we not have every classroom an open-air one and every child allowed to receive the benefits of this health essential?

In the rural school building the problem is rarely one of ventilation alone. It is so closely associated with heating that the two cannot be considered separately. The attempt to gain what is considered needed warmth by the simple expedient of closing all doors and windows and placing a large stove in the one room of the school building is an almost universal practice. Probably our rural school buildings are more imperfectly ventilated than our city schools. The most simple expedient that has been devised to correct this condition in a way whereby draughts may be avoided and necessary heat conserved is to take out an upper pane or piece of glass from each window and cover the opening with a single fold of unbleached muslin, which may be tacked in place on the window sash. This will allow a constant diffusion of fresh air throughout the room, with no draughts. It also filters the air that goes into the classroom. Such an expedient has been tried out in many rural school buildings, and the results have been satisfactory.

In all of the studies that have been made of the comparative value of mechanical and open-window types of ventilation, the matter of the relation of temperature to the health of the children has received consideration. In the studies already discussed full consideration has been given to this question. As a general conclusion it has been found that temperatures above 68° F. react unfavorably upon the child's health, as well as upon his comfort and sense of well-being. If temperatures below 50° F. are maintained, additional outdoor clothing should be provided for the child, as the effect of this lower temperature upon the body seems to lower the vitality and nullify any valuable effects that

might result from breathing the cooler air. As far as possible, classrooms should be kept at or below 68° F., but this temperature is only satisfactory and healthful when the ventilation is adequate, by whatever means this is produced.

Lighting.—The ideal classroom construction requires that the window space be at least one-fifth the floor space, and that the windows be placed so that the light enters the room at the left and slightly to the rear of the children when seated at their desks. Such window lighting should be adequate for all ordinary classroom purposes. Adequate lighting of the classroom is a factor of great importance in the prevention of eyestrain. The floors and walls, the cleanliness and location of the blackboard so that it may avoid dazzling cross lights, and the character of the printing and type used in text books, all have a definite relation to this subject. Classrooms should be so constructed that artificial lighting systems are not necessary. When the latter are required, the matter is one which must have detailed technical supervision, with a greater analysis of necessary lighting requirements and placements than our present consideration of the subject will allow.

Individual Drinking Cups and Towels.—The possibility of transmission of contagious diseases through use of the common drinking cup and common towel has received so much attention that avoidance of their use is now considered an essential of proper school hygiene. In many schools it will be found possible to install drinking fountains of various types. The points to be considered in this connection are that the fountain should be of such construction that no part of the child's face or mouth will touch any part of the fountain when the child is drinking the water. These fountains may range from the most costly and complicated systems to simple inversion of the ordinary water faucet, allowing a stream of water to run up instead of down. Provision of individual paper drinking cups is expensive. This expense may be avoided by having each child bring his own cup from home and keep it in his desk for his in-

dividual use. The same objection has been brought forward to the use of the individual towel. The cost of supplying a sufficient amount of paper towels has been found to be almost prohibitive. In many instances a successful method has been devised by having each child bring from home a towel to be kept in his desk and used only by himself. These towels are to be taken home for the purpose of having them laundered at as frequent intervals as may be necessary. Supervision of this matter of having each child have his own cup and towel is comparatively simple for the classroom teacher and probably offers the most easily followed system. However, when provision can be made for the school to assume this responsibility, it should be done. The point to be remembered is that under no circumstances should any child use the cup or towel that has been used by any other child.

Hygienic Maintenance and Care of Classrooms.—Dry sweeping and dusting of classrooms should be prohibited. Oil dressings or sprays are recommended for use on classroom floors. These are economical, as they need to be applied only at infrequent intervals, usually about once each school term. Their use obviates dust, and they need only to be wiped off with a soft cloth in order to make them entirely clean. Floors should be wiped in this way at least once a week, or more often if indicated. If oil dressings are not available, the use of damp sawdust or pieces of damp newspaper or damp tea leaves when sweeping will be found a fairly good substitute in avoiding dust. Classroom furniture should be wiped with damp cloths at least once each week and the walls cleaned at the beginning of each school term.

CHAPTER XII

THE CHILD OF SCHOOL AGE

Contagious Diseases

In the popular mind the occurrence of contagious diseases is mainly associated with the child's entrance to school and its early school life, and schools have been looked upon as being the greatest factor in the spread of these diseases. It is undoubtedly true that the close association of children in classrooms affords an ideal method for transmission of any infection. The same undoubtedly holds true, also, when any considerable number of children are gathered together for a definite time in any other place. Boarding schools usually report epidemics of measles, chickenpox, and whooping cough, or even those diseases that are considered more serious, such as diphtheria and scarlet fever, after the Christmas and Easter holidays, due to the fact that the children have come into contact with many other children at parties, group games, the theater, movies, or other places where many children are assembled, particularly indoors. In the case of boarding-school children there is added danger because of their contact with children who come from other schools or other places, thus affording a more varied opportunity for spread of any infection that might previously have existed in a large number of different places. Where children are kept continuously under observation in a boarding school and not allowed at any time during the term to visit their homes, these diseases may be entirely eliminated. In day schools, whether public or private, the children are subject to the chance of contracting a contagious or infectious disease both in the school and in the contacts that come with home life.

Practically all of the common infectious diseases are readily contracted, and because children are usually susceptible and have a low degree of immunity, these diseases naturally occur among the early age group. In considering the school a factor in the dissemination of infectious or contagious diseases, two matters should be taken into account: first, the fact that the preschool age and not the school age is the time of the greatest prevalence of all of the common forms of contagious diseases. In the chapter on care of the child of preschool age we have discussed the extensive prevalence of infectious diseases in the group under five years. The greater proportion of children have had these diseases before they enter school. Children of school age also have acquired greater immunity to most of these diseases and are rapidly approaching the type of adult immunity. For these reasons contagious diseases are not as common during school life as has been supposed, but the school must still be looked upon as affording an opportunity for the dissemination of contagious diseases unless proper precautions are taken. Second, we know now that if the school is a factor in the dissemination of infectious diseases, it may also be made one of the greatest aids in their prevention. Proper school sanitation and hygiene and attention to the health needs of the child afford an unparalleled opportunity for control or elimination of infectious diseases.

Closing Schools as a Means of Controlling Epidemics.—In October, 1917, the American Public Health Association requested the Federal Bureau of Education to conduct an inquiry as to the value of closing schools during any epidemic of contagious diseases. The bureau acted in cooperation with a special committee appointed by the association for that purpose. The following is the summary of the preliminary report of the committee:

Scope of Inquiry.—The committee decided to limit the inquiry to the following three lines: (1) summary of state laws bearing upon the question; (2) review of literature on the subject; (3) inquiry to be

sent to fifty selected cities covering regulations, rules of practice, and results.

1. *State Laws.*—An incomplete survey of state laws shows very few specific statutory references to the matter; rather general authority to control is vested in an administrative body.

2. *Review of Literature.*—Review of more than one hundred fifty papers published during the past twenty years in journals, in official reports, and as chapters of books shows progressive abandonment of faith in the practice of school closure as a measure of controlling epidemics affecting school children. Yet even in recent literature there are still some expressions of opinion in favor of closure under special conditions. Analysis of these special conditions shows that they are of three types:

(1) etiology of the disease unknown, that is, in epidemics of infantile paralysis, epidemic meningitis, and possibly a few other diseases, it may occasionally still be necessary to resort to closure of schools;

(2) severity of an epidemic that defies all efforts at control;

(3) inadequate medical supervision of schools.

With these qualifications, the concensus of judgment in the literature reviewed may be summarized as follows:

The closure of schools is an extremely clumsy, unscientific, and unsatisfactory method of controlling epidemics among school children. It results not only in loss of school time and money, but it fails to control, inasmuch as infected children are at large, playing in the street, without restriction, and therefore spreading the infection.

The modern method, consisting of careful daily inspection of infected children, isolation of sick children, and quarantine of contacts, is both more effective and more economical.

Closing of schools should be considered as a last resort, to be used only when thorough and systematic application of other measures fails to effect control.

It is also recognized that in sparsely populated rural areas, where aggregation takes place only in the schools, closure may be necessary. It is further recognized, however, that this condition would yield to adequate inspection.

As a result, the bureau and the committee came to the conclusion that "closure of schools as a means of controlling epidemics of measles, whooping cough, scarlet fever, diphtheria, smallpox, and poliomyelitis (infantile paralysis) is unnecessary, unscientific, and unjustifiable. That disinfection by fumigation is unnecessary and ineffective. The use of chemical solutions is generally unnecessary. Disinfection

by air and sun and cleansing with hot water, soap, and scrubbing is to be commended." The committee further concluded that "the proper method of control involves sufficient inspectorial force of physicians and nurses to maintain close supervision of cases and contacts; enforcement of isolation and quarantine under elastic administrative regulations; the employment of clinical and laboratory tests and reliance upon such data; close correlation of the school medical inspection, on the one hand, with the health department, and, on the other hand, with the school forces, and continuous education of the public."

In the widespread epidemic influenza which occurred in 1918 all health departments were faced with the problem as to whether or not public places such as theaters and schools should be closed. For purposes of public safety, many communities found it wise to close the moving-picture houses and theaters and to restrict the attendance and control the conditions of any indoor assemblages. Nearly all cities and towns closed their schools for a greater or less period. One marked exception was New York City. The Department of Health of that city considered that the schools offered an ideal opportunity for the control and prevention of this disease among children of school age.

Concentrating its entire force of school doctors and nurses upon the problem, a program for this purpose was put into effect. It included having the children go directly to their classrooms upon arrival at school. The children of one classroom were not allowed to play with or come into contact with those of other classrooms. Recess was held at varying times. At the end of the school session the children were required to go directly home. Group games, except among children of individual classrooms, were prohibited. The teachers were carefully instructed as to the symptoms that might be expected to indicate the presence of the disease. Each morning each child in the classroom was inspected by the teacher. If any child showed evidence of illness in any form, the fact was immediately

reported to the school doctor or nurse who visited each school each day for the purpose. These children were then examined by the school doctor or nurse, and if there was the slightest indication of illness, the child was sent home at once, visited there by a diagnostician of the Department of Health and kept under observation until a diagnosis could be made. If the child was found to be well, he was allowed to go back to school; if ill, he could be kept under proper supervision and quarantine until termination of the disease.

As a result, the age group from five to fifteen years, approximately one-fifth of the entire population of the city, received the benefits of an intensive form of health supervision which was impracticable, if not actually impossible, for any other group in the community. During the entire time of the influenza epidemic the rate of absence from school of either children or teachers was not greater than that reported during the same months in previous years. Moreover, the age group from five to fifteen years showed the lowest incidence of occurrence of influenza or of deaths from the disease of any age group of the population; in fact, it may be said that the epidemic of influenza in New York City did not affect the children of school age. Their sickness and death rates were no higher than those commonly expected at that time of year. The intensive form of school medical inspection practiced in this instance was entirely successful and the school, instead of acting as a menace to the health of the children and a focus for the spread of the disease, proved to be the best possible instrument for the control of the condition and the prevention of its occurrence.

As a result of this experience, there can be little doubt of the value of the school in our campaign for prevention of infectious and contagious diseases. We must, however, remember that if no proper system of school health supervision is carried out, school contacts and the grouping of children in school will still afford the best method we know of spreading infectious diseases. With proper school health supervision, the school will be found to be the most valuable

weapon we have in eliminating the incidence of these diseases during school life.

For many years the school has afforded the best opportunity for extended vaccination against smallpox. Many states and local communities have laws requiring that each child shall be vaccinated upon entrance to school. Within recent years the school has also afforded an opportunity for widespread use of the Schick test to determine whether or not the child is immune to diphtheria, and in case of lack of immunity, for administration of toxin antitoxin mixture for the purpose of affording the immunity that is essential. The methods and technique of the Schick test will be mentioned later.

Probably one of the reasons why the school has been associated with the occurrence of contagious diseases is that they open in the fall, just about the time when the weather becomes cooler, houses and schools begin to be heated, and indoor living, with closed windows and lack of proper ventilation, is practiced. What is known as the "contagious disease curve," or the graphic presentation of the incidence of these diseases, is at its lowest point during the summer. It rises rapidly, to attain its maximum height about February or March, and then shows a marked decline until it again reaches its summer minimum. There would seem to be little reason why contagious diseases should be more prevalent in the winter months than in the summer, except for the fact that the warm weather offers opportunities for outdoor living that are, to a great extent, not taken advantage of during the winter. The tendency toward outdoor living in winter, which is becoming increasingly prevalent, will undoubtedly be one of the greatest factors we have in the prevention of a rise in the rate of occurrence of contagious diseases during cold weather.

In any program for the prevention of contagious diseases in school life. we must take into consideration the method whereby the germs of these diseases gain access to the body and the conditions under which they cause the occurrence

of the disease. The acquiring of any disease may be divided into two parts: the presence of the germ or activating cause, whatever it may be,—that is, the thing that actually produces the disease; and second, the amount of resistance that the individual has toward this disease, whether it be a natural immunity or one that is acquired. Acquired immunity may be obtained by means of vaccines or sera that have a specific action in rendering the individual immune or by building up the bodily resistance to such a point that immunity is afforded because of the physical resistance of the individual.

Contagious diseases are germ diseases. The infectious germ or material usually finds its entrance into the body through the mouth and nose. Contrary to general opinion, germ diseases are not, except to a limited extent, air-borne. The method of their transmission is by intimate contact with a person who has the disease in question and by the direct transmission of the infectious material from one person to the other. The act of sneezing, coughing, or even speaking may serve to transmit the infection. The germs of nearly all of these diseases can be found in the fine particles of moisture coming from the mouth of the person who is infected with the disease. A colloquial expression is to say that most of the germ diseases are "arm-length diseases"; that is, the infectious material cannot be carried further than the distance maintained between two people when shaking hands with each other. Any article that is soiled with the excreta from mouth, nose, or other body discharges of a person ill with the disease may be the means of transmitting it to another person, if the soiled article is handled by the latter.

Prevention of Contagious Diseases in Schools.—Proper sanitation and hygiene of the school building play a large part in preventing the spread of infectious diseases. Fresh air and sunlight are the best two preventives we have. Adequate ventilation of the classrooms, preferably by means of open windows; proper orientation of the classrooms so

that for several hours each day they are flooded with sunlight; cleanliness of walls, floors, and desks, with no dry sweeping; use of oil sprays as a floor dressing, thus limiting the possibility of dust; clean blackboards and erasers, with avoidance of dust from these or any other source; and an equable temperature not above 68° F.—are all essential. Proper placing of the desks so that an aisle of at least two feet may be maintained between each two rows of children, individual desks, the use of individual towels and drinking cups and pocket handkerchiefs, observance of a strict rule that each child must have his own pencils, school books, and other articles needed in class work, must be followed. Health habits must be practiced, both in the school and in the home. Children should be taught always to use a handkerchief in front of the mouth when coughing or sneezing. Clothing should be suited to the temperature and not to the time of year. Outside of school hours, the children should be kept in the open air as much as possible, and hygienic conditions should be maintained in the home. Proper food, well-ventilated sleeping rooms, a daily bath, adequate sleep and quiet, and abundant wholesome outdoor play will all tend to build up proper bodily resistance. As nearly all these diseases are acquired through the mouth and nose, the hygiene of the mouth and naso-pharynx should receive attention.

Germs require four things for their development: warmth, moisture, darkness, and food. All of these are provided by unclean mouths and decayed teeth. Dental hygiene offers one of the most efficient weapons we have in the prevention of infectious diseases. Attention to the presence of enlarged or diseased tonsils and adenoid growths is essential.

The co-operation of the child in establishing proper health habits must be secured. As a practical means of acquiring this with reference to prevention of infection, a definite outline given to each child is of value. Such an outline may cover the following rules, which may be printed on slips,

hung in the classroom, and given to each child to place on the wall of his bedroom:

1. Brush the teeth night and morning.
2. Wash the hands before each meal and after going to the toilet. See that the fingernails are kept clean.
3. Use a clean handkerchief each day. Never loan it to anyone, or borrow anyone's else.
4. Use your own pencil and school books. Do not lend them to anyone.
5. Use your own drinking cup and towel. Never allow anyone else to use them.
6. Never put into your mouth anything that has been handled by anyone else.
7. Stand erect.
8. Breathe deeply.
9. Eat slowly and at regular hours. Never eat between meals unless the doctor or nurse advises it.
10. Sleep at least eight hours every night in a room with open windows.
11. See that you have a bowel movement every day.
12. Play outdoors instead of indoors.
13. Remember that fresh air and sunlight will kill germs.
14. Remember that you can keep well and strong if you will do your part.

At the beginning of each morning school session, the teacher should observe each child in the classroom. If any shows evidence of illness of any type, he should be referred to the school doctor or nurse, or, in their absence, sent home and the doctor or nurse notified. The symptoms that the teacher should look for are those of extreme flushing of the face, unusual paleness, evidence of any rash or swelling, a condition of extreme apathy or fatigue where the child seems unable to make any effort, any discharge from eyes or nose, the presence of a cough or evidence of sore throat, unusual inability to concentrate the mind on school work, disinclination to play, and want of alertness in a child who

is usually alert and ready for whatever may come. It is not necessary for the teacher to know the specific symptoms of individual diseases, but rather to determine only whether or not the child seems well. In any case, the teacher should always exclude from school attendance any child who shows apparent evidence of illness in any form. It is far better that such a child should lose one or more days' schooling than that other children in the classroom should be infected. When a child is sent home, a note should be sent to the parents, calling attention to the fact that the child does not seem well and asking that the family physician be consulted at once.

If possible, an arrangement should be entered into with the local health board so that the school may be notified each day of the names and addresses of all children who have been reported on the previous day as ill with an infectious disease. The teacher should exclude from school any children whose names appear on the list and should see that they are not readmitted unless they bring an official certificate from the board of health. As a general rule, and in the absence of specific regulations, with regard to this matter, any other children living in the same family with the sick child should also be excluded for a period to be determined by the local health board. No child should ever be admitted to a classroom after any absence, unless the cause is definitely known, and he has been examined by the school doctor or nurse to determine if the absence was due to an infectious disease and if it is safe to have him attend school again.

The Common Contagious Diseases

It is not necessary to discuss in an exhaustive manner the etiology, symptoms, course, duration, or treatment of the contagious diseases. From the point of view of public health and with particular reference to the school child, however, the teacher should be familiar with the early symptoms, period of incubation, method of infection, ordinary duration of school exclusion, and exclusion of other children in

the same family. For these reasons a brief résumé of the diseases that commonly occur in children of school age will be made:

Scarlet Fever.

Incubation period is usually two to seven days. In this disease the onset is usually sudden, the child complaining of headache, showing evidence of feverishness, and there is almost without exception the characteristic sore throat, with redness, and occasionally patches on the tonsils. Sometimes the child will vomit without warning, and this sudden, unexpected, so-called "projectile" type of vomiting is quite characteristic of the onset of scarlet fever. The rash of this disease usually appears within twenty-four hours after the onset, first on the neck and chest, then rapidly spreading over the entire body. In mild cases it may not appear on the face. It is finely spotted, diffuse, and bright red. It lasts from three to ten days, and shortly after it fades the skin begins to scale or peel off, first on the neck and chest—where it appears as fine scales—and later on the body and hands and feet, where the desquamation may be in large strips and may last from three to five weeks.

Method of Infection: Mainly from the discharges from nose and mouth. The disease is transmitted by close personal contact or by handling articles that have been soiled with the body discharges. These discharges, particularly if there is a secondary ear trouble with discharge from the ear, are capable of transmitting the disease. The germ causing scarlet fever has not been isolated and its exact type is not known.

Duration of the Infective Period and Exclusion from School: These will vary in different localities and the regulations of the local board of health should be followed. In general it is believed that a child who has had scarlet fever may be a source of infection to other children for a period approximating five weeks after the onset of the disease.

Exclusion of Other Children in the Family: Local regu-

lations should be followed. If the children are removed to another living place at once, they should remain away from school at least during the possible period of incubation of the disease. If continuing to reside at home, they should not be readmitted until there is no longer any danger of their contracting the disease.

Measles.

The *incubation period* is from eleven to fourteen days. The onset is gradual. The early symptoms are usually those of cold in the head with running of the nose, and inflamed eyes with watery discharge. Sometimes the child has a cough or what seems to be an acute bronchitis. Occasionally there is sore throat. The rash appears about the third day. It is first seen on the forehead and face or behind the ears and on the neck. It consists of small red spots which are scattered, irregular in form, usually occurring in groups which may be separated by patches of normal skin. At the height of the disease there is a good deal of swelling of the face, usually about the eyes. The rash gradually spreads over the entire body, lasts from one to six days—the average being four days—and is then followed by a fine, branny desquamation of the skin, which begins as soon as the rash has subsided, and lasts from five days to two weeks.

Method of Infection: The disease is carried by discharges from the nose and throat. It is very contagious, but the infectious material is short-lived. The germ causing the disease is unknown.

Exclusion of the Child and Other Members of the Family from School Attendance: This should follow the local regulations of the board of health. Usually all danger of infection is over two weeks from the date of onset of the disease.

German Measles.

Incubation period is eight to sixteen days. The illness is a slight one. Onset may be sudden, and often the rash is the first thing noticed. There is rarely any cold in the head or cough. There may be feverishness and slight sore throat. The rash appears first on the face, rapidly extending

over the body. There is usually a characteristic swelling of the glands of the neck, behind the ear. The duration of the disease is short, usually not more than three days, and there is slight or no desquamation. The disease is carried by means of discharges from throat and nose. *Exclusion from school* is the same as for measles.

Chicken pox.

Incubation period is from fourteen to sixteen days. There are rarely any early symptoms, but occasionally there is slight feverishness, and a feeling of lassitude may be noticed about twenty-four hours previous to the onset of the rash. Generally, the eruption is the first thing that indicates the child is ill. It consists of small, red, widely scattered papules, usually appearing first on the face, scalp, or shoulders, then spreading over the body. They change from the small, red papules to pustules. These are covered by a scab, and may appear in all stages of desquamation at the same time. The scabs or crusts contain the infectious material, the exact nature of which is unknown. Exclusion from school must depend upon the local regulation, but generally the infection may be transmitted as long as the scabs remain.

Whooping Cough.

Incubation period is seven to fourteen days. Early symptoms are cold in the head, with cough, which has a tendency to be worse at night. The cough is not unlike that of a severe bronchitis, but tends to become more and more spasmodic in character until the characteristic "whoop" of the disease appears about the second week. There may be vomiting after the spasm of coughing, and during the spasm the child may seem unable to breathe and will often show signs of fright and fear. Any spasmodic or chrŏnic cough should always be looked upon with suspicion as possibly a case of whooping cough. It is easily transmitted through discharges from nose and throat. There is no definite time for exclusion from school. Some boards of health have regulations regarding the matter, but the disease is essentially protracted and may last for several months. Recent investi-

gations have shown that it is probable that the infectious nature of this disease does not persist after the whoop is well established, and in all probability the time of exclusion from school could be greatly lessened without harm either to the child or to others with whom he may come into contact.

Whooping cough is one of the few infectious diseases where we know definitely the character of the infectious material. The specific micro-organism, known as the Bordet-Gengou bacillus, has been isolated and is the specific cause of whooping cough.

Mumps.

Incubation period is seventeen to twenty days. During the early stage of the disease the child may feel sick and feverish and general apathy or listlessness may be noted. Generally, the first symptom that is noted is definite swelling of the parotid gland, which is situated in front of and reaching slightly below the ears. Mumps may affect one or both of these glands. The swelling of the glands is painful, the glands themselves being tender when touched. There is difficulty in opening the mouth and the child complains that his mouth is dry, the saliva sticky and thick. Sometimes the rise in temperature may be quite marked and the child definitely ill. Ordinarily, in early childhood, the disease is light and the character of the attack increases in severity as the child grows older.

Exclusion from School: The child should not be allowed to return to school until the swelling has entirely disappeared. Local regulations with regard to exclusion must, of course, be adhered to. Other children in the family need not be excluded if they have had the disease; otherwise they should not be allowed to return to school until the ill child is well again. The nature of the infectious material of mumps is not known.

Diphtheria.

The characteristic signs of diphtheria are the sore throat, fever, and sometimes a thick, mucopurulent discharge from

the nose, swelling of the glands of the neck, general debility and, in extreme cases, great lassitude. The throat may be simply red and congested or may show patches. Positive diagnosis of diphtheria may sometimes be made clinically, but the only safe way is to have cultures taken from the throat to determine whether or not the case is one of true diphtheria.

The *incubation period* of diphtheria is not known. There are few other contagious diseases, however, concerning which we have such definite information. The bacillus of diphtheria is known as the Klebs-Loeffler and was discovered in 1883. It was not, however, until 1895 that an antitoxin for the treatment of this disease and for passive immunization was perfected. Twenty-five years ago about 150 persons out of every 100,000 in our population died from diphtheria. At present, only 21 in every 100,000 die from this disease. The use of diphtheria antitoxin in the early stages of diphtheria is undoubtedly responsible for this decline in the death rate. It has been discouraging to note, however, that the death rate from diphtheria has not shown a definite decrease within recent years. The use of antitoxin as an immunizing agent has undoubtedly saved many lives by preventing spread of the disease, but as the effect of the usual dose lasts only about three weeks, its value has been limited, as no permanent immunity resulted.

In 1913 Dr. Bela Schick of Vienna made the discovery which has since gone by his name, and developed the Schick test for determining whether or not any person is immune to diphtheria. Doctor Schick found that when a minute quantity of the "toxin" or poison of diphtheria was injected into the skin, usually just below the elbow, a small reddish spot would appear within twenty-four hours if the person who had been injected was not immune to the disease. This red spot was what is called a "positive reaction" and represented the action of the irritant toxin upon tissue cells that were not protected by whatever antitoxin the person might have in his system. This reaction indicated the absence of

immunity to diphtheria. The place of redness which appears after the Schick test has been made is at the site of the injection, and it appears in from twelve to twenty-four hours. Usually a distinct reaction shows in the course of twenty-four to forty-eight hours. The reaction or color of this spot reaches its height on the third or fourth day and gradually disappears, leaving a circumscribed area of brownish color, which may scale or peel off and which persists for from three to six weeks. The degree of redness and what is known as the infiltration of the surrounding tissues vary with the susceptibility of the person who has received the test.

The negative Schick test or reaction is one in which the skin at the site of the injection remains normal, where no change in color of the skin or infiltration of the tissues is evident. This negative reaction indicates that the person is immune to diphtheria. If the person who has had the test is over three years of age, a negative Schick reaction usually indicates that the immunity is a permanent one.

A third form of reaction has been noted and is called a "pseudo reaction." The technical explanation of the pseudo reaction is that there is a local anaphylactic resistance of the tissue cells to the protein substance of the autolyzed diphtheria bacillus which is present in the toxic broth used for the test. This reaction is like urticaria, or hives, usually appears within six to eighteen hours, reaches its height in thirty-six to forty-eight hours, and disappears from the third to the fourth day. There is rarely any scaling after this reaction. Its appearance is significant in so far as it must be distinguished from the true reaction because it sometimes occurs in persons who are immune.

The Schick test has been found to be of great value in determining the number of children who are immune to diphtheria. Practically, its widespread use among school children has revolutionized our methods of controlling the occurrence of diphtheria in this age group. If the child gives a negative reaction to the Schick test, it is known to

be immune to the disease and therefore may be exposed to a case of diphtheria without danger. Formerly when a case of diphtheria occurred we thought it necessary to give immunizing doses of ordinary antitoxin to every other child in the classroom. Since the Schick test has been used, the immunizing dose need not be given except to those children who have been shown to be non-immune as a result of the Schick test. This test has been extensively applied in many of our large cities. No harm has ever been shown to result from its proper use.

Dr. William H. Park states, as a result of his work in the research laboratory of the New York City Department of Health, and among children of that city, both in the baby health stations and in the schools, that the susceptibility to diphtheria at various ages is shown by the following table:

Age	*Susceptibility*
Under 3 months	15 per cent
3–6 "	30 "
6–12 "	60 "
1–2 years	60 "
2–3 "	60 "
3–5 "	40 "
5–10 "	30 "
10–20 "	20 "
Over 20 "	12 "

In other words, susceptibility to diphtheria is at its height from six months to three years. After that time it declines and immunity is established until in persons over twenty years of age only 12 per cent are susceptible. The rest are immune. Babies born of mothers who are immune have the same immunity as their mothers, but this immunity is not necessarily retained and may be lost as the child grows older.

Toxin-Antitoxin Vaccine: This vaccine has been developed by Doctor Park and his associates, and its results have been found to be permanent, so far as the effects may be judged within the time that it has been in use. The theory

upon which the toxin-antitoxin for permanent immunity against diphtheria is based is that injections of the diphtheria toxin will stimulate the formation of the necessary antitoxins within the body. In order, however, to give a sufficient dose of toxin to stimulate the production of a sufficient amount of antitoxin, it is necessary to neutralize the toxin by an amount of antitoxin, as part of the injection, in order that it may be used with safety. As Park states: "The diphtheria toxin is so poisonous that in order to use it for the purpose of immunizing human beings or animals, it is necessary to begin with minute doses. The amount of each succeeding dose is very gradually increased. This process consumes much time and unless carried out with the utmost skill and patience it is not altogether safe. Experimenting with guinea pigs with a mixture of toxin and antitoxin, it was found that the toxin could be neutralized to the extent of not being poisonous, and yet have the power to stimulate the development of toxin antitoxin. It was also found that the usual injection of toxin for all ages is approximately 400 times the fatal dose for a half-grown guinea pig, to which has been added just sufficient antitoxin to neutralize it, this being about four units of antitoxin. The total amount of the injection usually contains about 1 c. c. of fluid and is made subcutaneously. The total amount of diphtheria toxin injected in the Schick test represents one-fiftieth of the minimum lethal dose of toxin for a 250 gr. guinea pig."

The toxin-antitoxin is given in three separate doses, at one-week intervals. In babies and young children the reaction is slight. There may be a little fever, some restlessness and irritability. In older children and in adults, the reaction may be more pronounced. No harm has ever been known to result from the use of toxin-antitoxin except in one instance during the winter of 1923-24. During a time of particularly cold weather, some children in a few schools in Massachusetts were injected with toxin-antitoxin that had been frozen. This freezing process precipitated the toxin and separated it from the antitoxin, thus giving a pro-

nounced reaction. While the children who received these injections were quite ill, there were no fatalities, nor did any permanent harm result. Health officers universally are now warned against the use of frozen toxin antitoxin solution. When this one danger is avoided, the injections may be made with perfect safety.

Diphtheria Carriers: A situation that has caused much concern in the past has been the presence of what are known as "diphtheria carriers." These are persons who, being themselves immune to the disease, carry in their throats or nasal passages virulent diphtheria bacilli which makes them capable of transmitting the disease to others. About 1 per cent of our school children have been found to be actual foci of danger because of the fact that they are carriers of virulent forms of diphtheria bacilli. While this has been a problem difficult to handle, universal immunization of children by means of toxin antitoxin injections will render diphtheria carriers innocuous.

There is every reason to believe that general acceptation and use of both the Schick test to determine the presence of immunity and toxin-antitoxin injections in non-immune persons will eventually eliminate diphtheria and thus wipe out one of the greatest scourges that have ever existed. The results undoubtedly will be as efficacious if not more so than those that have come about as a result of the universal application of vaccination for prevention of smallpox.

Other Infectious Diseases.—Other contagious or infectious diseases which may be mentioned as closely related to school life are tuberculosis, typhoid fever, and influenza. Other diseases that are found in early life, such as cerebrospinal meningitis and poliomyelitis (infantile paralysis), are not common enough to warrant any extended consideration in discussion of the control of contagious diseases in school life. While sporadic cases of both these latter two diseases may occur, they frequently come in the form of epidemics and then assume their place as a general public-health prob-

lem, to be dealt with by health authorities by virtue of whatever local regulations may seem essential.

The occurrence of syphilis in children or gonorrhœal vaginitis in young girls may also warrant attention, although neither of these conditions has been found to be more than sporadic. The use of the horseshoe-shaped toilet seat in schools may be considered a preventive of the spread of gonorrhœal vaginitis. This disease, however, is difficult of detection. Syphilis may be detected in its advanced stages, but rarely at an early stage, and instances of it are more generally brought to the attention of school physicians by reference from private physicians or dispensaries than because they are detected during the routine of school health supervision.

The occurrence and prevention of tuberculosis warrants more extended consideration. Many organizations, both national and local, are carrying on an extended campaign for the prevention of tuberculosis in children. During infancy, the natural lowered resistance to the disease occurring in a child born of parents, one or both of whom are tubercular, is increased by the possibility of infection after birth through contact with the parents. There have been many instances when care of these infants at what are known as "preventoria" has shown excellent results. Separation of the child from its parents at an early age is often advised as a measure of precaution in the prevention of this disease. On the other hand, this separation may be extremely unwise, and deprive the baby of its mother's care at a time when it is most needed. Each case, therefore, must be judged upon its individual merits, and the home environment, together with the baby's needs, taken into consideration.

For older children the school affords a remarkable opportunity as a factor in the anti-tuberculosis campaign. Children who have been exposed to the disease, or who live in families in which there is a case of tuberculosis, should, as far as possible, be assembled in classes by themselves, preferably outdoor classes, and given particular care and atten-

tion both during the time they are in school and at home. So-called "susceptible children," or those who may readily contract the disease, need not necessarily be separated from other children, but should have the advantage of the open-air life. All children who are undernourished or whose vitality is lowered require the same careful supervision.

In addition to the open-air treatment, special feeding should be provided. The study made with reference to the relation between respiratory diseases and the type of classroom ventilation, which has already been mentioned in the discussion of ventilation of classrooms, seemed to point to the possible relationship between lack of proper ventilation and the occurrence of any infectious diseases, with particular reference to those affecting the respiratory tract. Tuberculosis would, of course, be included in this category, and undoubtedly the provision of properly ventilated classrooms will be more effective in the prevention of tuberculosis in children than any other means that has been tried so far.

Contagious Eye and Skin Diseases.—With the exception of pediculosis, the school must bear whatever blame there is for the occurrence or spread of the contagious eye and skin diseases. As has been noted elsewhere, the fact that these diseases were so widespread as to be almost universal was the cause for the employment of the first school nurse. This occurred in 1902 in New York City, when it was found that over 20 per cent of all children in the public schools had some form of infectious eye or skin disease. At that time trachoma occurred among slightly over 20 per cent of all children; pediculosis was found in 70 to 80 per cent, scabies and ringworm in 10 to 12 per cent, and the other diseases in greater or less degree. It has been possible to almost entirely eliminate these diseases as a factor in school life by the use of the school nurse. The former common method—one that is still accepted in some localities—was to exclude from school at once any child affected with any one of these diseases. When the diseases are unduly prevalent such exclusion may result in a distinct interference

with the school routine, as well as a marked loss to the individual child, when measured in terms of schooling. The work carried on in New York City proved without question that it is possible to keep children so affected in school, provided the disease is not of the most serious type and the child is kept under continuous and protective treatment until it is cured. Experience has shown that children sent home because of the presence of any of these so-called "minor contagious diseases" affecting the skin or eyes rarely receive proper care. The parents consider the disease of so mild a character that, at best, they give the child only simple home treatment and rarely take them to a physician. Such children are allowed to play in the street with other children and may easily become a menace. Moreover, the time lost from school attendance may extend over many days or weeks.

Standard forms of school treatment for these diseases have been devised in New York City and their use has been attended with such success that they are given herewith:

CONTAGIOUS EYE AND SKIN DISEASES: METHODS OF TREATMENT EMPLOYED BY THE SCHOOL NURSE

FAVUS: RINGWORM OF SCALP.

Mild cases: Scrub with tincture of green soap and cover with flexible collodion.

Severe cases: Scrub with tincture of green soap, paint with tincture of iodine, and cover with flexible collodion.

RINGWORM OF FACE AND BODY.—Wash with tincture of green soap and cover with flexible collodion.

SCABIES.—Wash with tincture of green soap and apply sulphur ointment.

IMPETIGO.—Remove crusts with tincture of green soap and apply white precipitate ointment (Amon. hydrarg).

MOLLUSCUM CONTAGIOSUM.—Express contents. Apply tincture of iodine on cotton-covered toothpick.

CONJUNCTIVITIS.—Irrigate with solution of boric acid.

PEDICULOSIS.—Saturate scalp and hair with mixture of equal parts of kerosene and sweet oil. Next day wash with a solution of potas-

sium carbonate (one teaspoonful to one quart of water), followed by soap and water.

The nurses should not treat trachoma in the schools, and all cases of eye disease with mucopurulent or purulent discharge should be excluded from school attendance until cured. Cases of pediculosis with many live pediculi, or cases of ringworm, scabies, mumps, or other infectious skin diseases, covering more than a limited part of the body, may be justifiably excluded. Whenever it is possible to apply the necessary treatment in such a way that it will entirely protect the lesion or eruption, the child may remain in school with no danger to himself or to others.

As a result of twenty-two years of application of this procedure in the New York City schools the contagious eye and and skin diseases are now practically non-existent. Three special classes maintained by the Department of Health for the treatment of trachoma were closed many years ago for lack of attendance, although previously they had been overcrowded. Hospitals maintained solely for operation on cases of trachoma have also ceased to exist. Special classes in schools for children with slight cases of trachoma have been discontinued. During the past five years there has not at any time been an average of more than five cases of any one of these diseases in any one public school in New York City for the entire school year. As an illustration of the scarcity of the diseases in question, I might say that as part of my course on school health work at Teachers College it has been my habit to take the students for an annual clinic to one of the public schools of the city. For the purpose of affording material for the clinic, all of the nurses in the Borough of Manhattan have been asked to bring to this school every available case of trachoma, ringworm, scabies, molluscum contagiosum, impetigo, or other contagious skin or eye disease. At no time during the past five years has it been possible to assemble more than three cases of any one of these diseases at any one of these stated periods, notwithstanding the fact that there are over 350,000 children

registered in the public and parochial schools in the Borough of Manhattan. Such a tribute to the efficiency of the school nurses would alone justify their existence.

The diagnosis of these various types of eye and skin diseases is a matter that rests with the physicians or nurses who have been trained in public-health work. It is rarely possible for the teacher to make a diagnosis unless she has had extended experience. For this reason, every child showing an eruption in any form, or any child suspected of having pediculosis, should be sent to the school nurse for more complete observation. What is called "routine school medical inspection" is of particular value in detecting this class of cases. Such a routine inspection should be conducted at least once each month of each child in each classroom. In the interim between the routine inspections the teacher should make a daily classroom inspection in order to determine if any one of these diseases exists among the children in her class.

For the effective treatment of the contagious eye and skin diseases the co-operation of the home is essential. This is particularly true with regard to pediculosis. All school hygienists are agreed that this is one condition which baffles them. It is a comparatively simple matter to clean up or cure a case of pediculosis, but unless all of the other members of the child's family are free from the infection, the child will become reinfected within a very short time. In boys, both the correction of this condition and its prevention are comparatively easy matters. With girls, and particularly with older girls, the situation is far more complex. In many of the schools appeals to personal pride must be made, particularly among the girls of the higher grades. Among the younger girls, simple expedients have been tried, with varying degrees of success. In one school where the wearing of a hair ribbon was considered a necessity, the principal made a rule that no girl could wear one unless her hair was clean. In some of the high schools it has been found necessary to refuse promotion or even graduation to

girls who were affected with pediculosis and who took no interest in remedying the condition. While the school nurse should be the final authority in determining whether or not pediculosis or nits are present, it should not be her duty or responsibility to carry out whatever treatment is needed to correct the condition. The nurse should give out appropriate directions to these children and, if necessary, visit the home at least once to see that the mother or the child is carrying out the right procedure, but she should not be required to wash the child's head or to carry out any of the methods of treatment needed. She should be relieved of this responsibility not only because her time may be spent to better purpose elsewhere, but also because the nature of the affection is such that unless a proper sense of responsibility can be developed in the child affected and in his family, the condition will recur almost immediately after it has been corrected. As a matter of common decency and cleanliness, the children or their families should be required to do everything that is necessary in this direction, and it might be well to have a definite rule in the school that the nurse is not to be expected to do more than advise and supervise the plan of procedure.

CHAPTER XIII

THE CHILD OF SCHOOL AGE

PHYSICAL DEFECTS

School medical inspection, primarily organized for the purpose of prevention or detection of contagious diseases in children, has now evoluted to a point where the conservation of the general health of the child is its most important characteristic. The first physical examinations made of school children to detect the presence of any physical defects were those conducted in New York City in 1905. Since then the relation of school life to child health has received the attention it deserves. Possibly too much stress has been laid upon the relative importance of the presence of individual defects and not enough upon consideration of the child's health as a whole. Within recent years our tendency has been toward health education rather than correction of already-existing defects. Moreover, we have possibly been biased in our attitude toward child health by the emphasis we have placed upon school health control, rather than upon the more desirable attitude of considering the health of the child of school age, in its relation to its life both in school and at home.

The school still affords the best avenue of approach to the child of school age, and the sanitation and hygiene of the school, as well as the health supervision of the child while in school, are essential, but a word of warning should be given against undue emphasis being placed upon this relation. Our duty to the child is not ended with mere provision of a routine system of school medical inspection. Here, perhaps, more than at any other period of childhood, it is necessary

for us to keep in mind the essential basis of child health work—that we are planning for a healthy, well-rounded childhood, and that the detail work required to achieve this goal should not be allowed to overshadow the result. Too many of our systems of school medical inspection are illustrations of the adage that "we are unable to see the woods because of the trees." Unfortunately, it has seemed necessary to concentrate upon detail and to perhaps overemphasize it for the purpose of bringing the public to a realization of the situation in this country with regard to child health. The most remarkable and far-reaching stimulus in this direction was the report of the government as to the health status of men who were summoned for the draft in the recent world war.

The country was aroused when it learned that over 30 per cent of the young men of this country between the ages of twenty-one and thirty-one years—probably the most healthy age group we have—were found to have one or more physical defects, the origin of which could be traced back to childhood and the prevention of which would have been comparatively easy if proper health supervision had been maintained before adolescence. To say that one-third of the youth of this country were or are physically handicapped is possibly an exaggeration, because many of these men were affected with physical defects which would not seriously interfere with their ordinary life, but which, nevertheless, were considered of sufficient importance to debar them from service in the army, in the early days of the draft, at least. Later, a more intelligent attitude toward this subject resulted in acceptance of many young men who had some of the physical defects in question, for it was found that the defects were capable of correction and that their effect upon the general health of the individual was not such as to cause definite physical impairment.

But even if we grant that our excessive apprehension was not wholly warranted, the fact remains that our full duty to the youth of this country has not been accomplished if

even a proportion considerably less than one-third are allowed to grow to manhood or womanhood, physically impaired because their health has been neglected during childhood.

For a considerable number of years school health supervision has concentrated its main efforts toward the detection and correction of physical defects. Only lately has emphasis been laid on the preventive side. It is somewhat of an indictment of the way in which school health supervision or school medical inspection has been carried on to note that physical defects among school children are almost as prevalent to-day as they were fifteen years ago, although in some of our cities where work for conservation of the health of children of school age has been carried on for a long period of time, some slight diminution may be shown. These results would seem to show that if school medical inspection is to be considered merely an expedient for the detection of already-existing defects and their correction, whenever possible, it has not and will not achieve its purpose. Only when the emphasis is placed upon prevention of these defects, upon the spending of our appropriations toward this end rather than in wasting them on unnecessary corrective work, shall we have measured up to our full responsibility to the child and to future generations.

The Extent of Physical Defects among Children of School Age.—Prof. Thomas D. Wood of Teachers College, Columbia University, New York City, has published a table of the prevalence of physical defects among school children in the United States which has been repeatedly quoted, and which may be considered the only authoritative utterance we have on this subject. Doctor Wood's conclusions are amply borne out by the figures of individual communities, and may well serve as a standard for determining the possible extent of physical defects in any locality. Doctor Wood states that "there are in the schools of the United States to-day approximately 20,000,000 pupils. Careful study of

statistics and estimation of all conditions lead to the following personal conclusions:

"From 1½ to 2 per cent (300,000 to 400,000) of these have organic heart disease.

"Probably 5 per cent (1,000,000) at least have now or have had tuberculous disease of the lungs.

"About 5 per cent (1,000,000) have spinal curvature, flat foot, or some other moderate deformity serious enough to interfere to some degree with health.

"Over 5 per cent (1,000,000) have defective hearing.

"About 25 per cent (5,000,000) have defective vision.

"About 25 per cent (5,000,000) are suffering from malnutrition, in many cases due in part at least to one or more of the other defects enumerated.

"Over 30 per cent (6,000,000) have enlarged tonsils, adenoids, or enlarged cervical glands which need attention.

AVERAGE PERCENTAGE OF DEFECTS FOUND IN A STUDY MADE OF CITY AND RURAL CHILDREN

Type of Physical Defect	Percentage	
	City	Rural
Heart disease	.40	.74
Mental defect	.15	.8
Lung disease	.32	1.25
Anæmia	1.5	1.65
Unclean	.17	1.7
Curvature of the spine	.13	3.5
Adenoids	12.5	23.4
Defects in hearing	1.3	4.8
Enlarged glands	13.01	8.28
Naso-pharynx defects	7.5	15.9
Malnutrition	7.65	16.6
Defects of vision	13.43	21.08
Enlarged or diseased tonsils	16.42	28.14
Defects of teeth	33.58	48.8

"Over 50 per cent (10,000,000)—in some schools as high as 98 per cent—have defective teeth which are potentially, if not actually, detrimental to health.

"Several millions of the children possess, each, two or more of the handicapping defects.

"About 75 per cent (15,000,000) of the school children in this country need attention to-day for physical defects which are partially or completely remediable."

A further study by Doctor Wood is of extreme interest as showing the relative percentage of these defects as found among children in city and in rural schools:

Doctor Wood has also made an analysis of physical defects occurring at certain ages, based upon the examination of 294,428 rural school children in Pennsylvania. Of these, 221,785 or 75 per cent, were found to have physical defects, distributed as follows:

Age	*Percentage of defects*
6 years	8.2
7 "	8.6
8 "	9.1
9 "	9.0
10 "	8.5
11 "	7.2
12 "	7.2
13 "	5.8
14 "	4.5
15 "	2.9
16 "	1.7

The chart given in the chapter on the preschool child shows the result of a study made by the Association for Improving the Condition of the Poor, in New York City, of children from one to eighteen years of age, to determine the prevalence of the various physical defects in each age group.

In 1921 I made a similar study, based upon statistical data, gathered as the result of physical examinations of large groups of school children in New York City for the years 1909 and 1921. These studies were made as part of the

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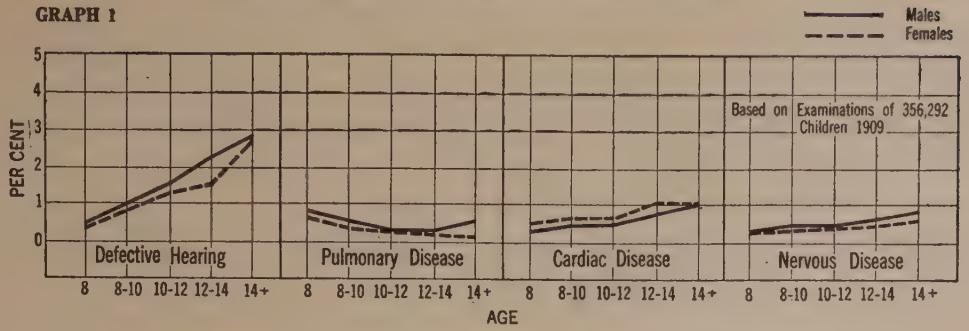
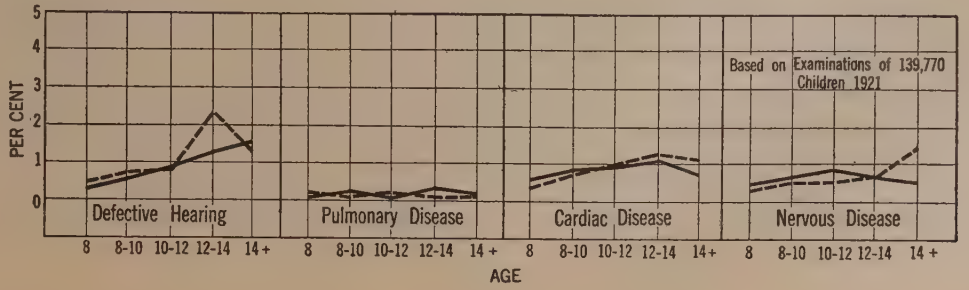
PERCENTAGE OF CERTAIN DEFECTS FOUND IN EACH AGE AND SEX GROUP

GRAPH 1



GRAPH 1A



work of the Bureau of Child Hygiene of the Department of Health of New York City. The 1909 figures included a statement of the age and sex incidence of physical defects found in a total of 356,292 children who had been examined by the school doctors The 1921 study included the same factors in a group of 139,770 children who had also been examined by the school doctors. The purpose of this study was to determine (1) if the incidence of physical defects had decreased from 1909 to 1921, and (2) the age and sex incidence of physical defects. The conclusions which I drew as a result of the study made by the Bureau of Child Hygiene apply with equal significance to the studies made by Doctor Wood and the A. I. C. P. In Doctor Wood's study the highest incidence of physical defects was found

DEFECTS FOUND AMONG SCHOOL CHILDREN

Their Incidence in Age Periods, by Sex

This is based on examination of public school children in The City of New York. 1909—356,292 children examined. 1921—139,770 children examined.

	No. Examined		Defective Vision		Defective Hearing		Hypertrophied Tonsils		Defective Nasal Breathing	
	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls
Under 8					.5	.4	30.0	29.0	27.0	23.0
1909	96,179	89,528			480	358	28,853	25,963	25,968	20,591
					.1	.09	17.1	16.9	16.1	14.2
1921	37,916	35,309			40	33	6,502	5,967	6,105	5,042
8–10 years			12.0	14.0	1.0	.8	25.0	27.0	25.0	22.0
1909	44,052	41,551	5,286	5,817	440	332	11,013	11,218	10,131	9,141
			9.1	11.0	.7	.6	13.6	13.5	11.3	11.3
1921	14,631	14,899	1,337	1,653	102	96	2,004	2,022	1,656	1,696
10–12 years			17.0	21.0	1.6	1.3	24.0	27.0	23.0	26.0
1909	23,100	22,869	3,927	4,802	369	297	5,544	6,174	5,313	5,945
			11.5	13.7	.8	.7	12.5	12.7	11.7	10.2
1921	9,114	8,710	1,054	1,200	73	64	1,141	1,111	1,071	896
12–14 years			19.0	24.0	2.3	1.6	25.0	27.0	21.0	27.0
1909	14,553	14,470	2,765	3,472	334	231	3,638	3,906	3,056	3,906
			12.2	13.7	1.1	1.9	11.9	12.0	9.5	8.4
1921	6,917	6,625	847	909	78	131	819	795	664	556
14 and over			21.0	22.0	2.8	2.7	21.0	22.0	18.0	21.0
1909	5,180	4,810	1,087	1,058	145	129	1,087	1,058	932	1,010
			13.3	17.2	1.8	1.3	11.0	10.5	8.4	6.4
1921	2,950	2,699	394	466	55	37	326	284	249	175

DEFECTS FOUND AMONG SCHOOL CHILDREN—*Continued*

Defective Nutrition		Pulmonary Diseases		Cardiac Diseases[1]		Nervous Diseases[2]		Defective Teeth		Total Defects found Average Defects per 100 Children Examined	
Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls
3.6	3.9	.8	.6	.5	.6	.3	.2	62.9	61.0	124.0	118.0
3,462	3,491	769	537	480	537	289	179	59,630	54,612	119,931	106,268
17.0	16.7	.1	.08	.6	.5	.4	.4	60.3	57.7	113.0	107.0
6,452	5,924	43	29	228	174	182	142	22,876	20,396	42,779	38,050
4.1	4.2	.6	.4	.6	.7	.4	.3	67.0	63.0	133.0	132.0
1,850	1,703	264	166	264	290	176	125	29,514	26,177	58,938	54,969
19.2	19.2	.2	.1	.8	.8	.6	.5	59.5	60.3	115.0	117.0
2,812	2,856	30	21	124	130	96	77	8,719	8,997	16,880	17,548
2.8	3.6	.4	.3	.6	.7	.4	.3	53.0	51.0	122.0	131.0
646	823	92	68	138	160	92	69	12,243	11,663	28,364	30,001
20.5	21.0	.2	.2	1.0	1.2	.7	.5	53.9	52.7	113.0	113.0
1,876	1,827	21	18	98	108	64	48	4,916	4,597	10,314	9,869
2.7	2.5	.3	.3	.8	1.0	.6	.4	47.0	44.0	119.0	105.0
392	361	43	43	116	144	87	58	6,839	3,183	17,270	15,304
17.9	17.4	.3	.2	1.2	1.6	.7	.8	44.4	42.9	99.0	99.0
1,244	1,157	24	12	86	108	54	55	3,074	2,842	6,890	6,565
2.4	2.2	.5	.2	1.0	1.0	.8	.5	42.0	43.0	108.0	113.0
124	105	25	9	5	4	41	24	2,175	2,068	5,621	5,465
14.7	15.1	.2	.07	1.2	1.6	.6	1.0	43.9	35.0	95.0	88.0
435	406	7	2	36	44	19	28	1,297	946	2,818	2,388

[1] Cardiac Diseases of old table is compared with Cardiac Diseases, Organic, of present table.

[2] Chorea of old table is compared with Nervous Diseases in present table.

at eight years of age. In the A. I. C. P. study the preschool age shows a higher incidence of defects of the head, nose and throat, lungs, abdomen, and orthopedic diseases, while the six-to-twelve-year group shows the highest incidence of defects of teeth, glands, skin, and nutrition.

In my study it was found that

(1) the less common and more chronic defects, such as pulmonary diseases, cardiac diseases, and nervous diseases, remained at about the same level of incidence throughout school life and are apparently influenced little, if at all, by the school environment.

(2) Defective hearing and defective vision show a steady and persistent increase from the entering age to the leaving age throughout the school life of the child.

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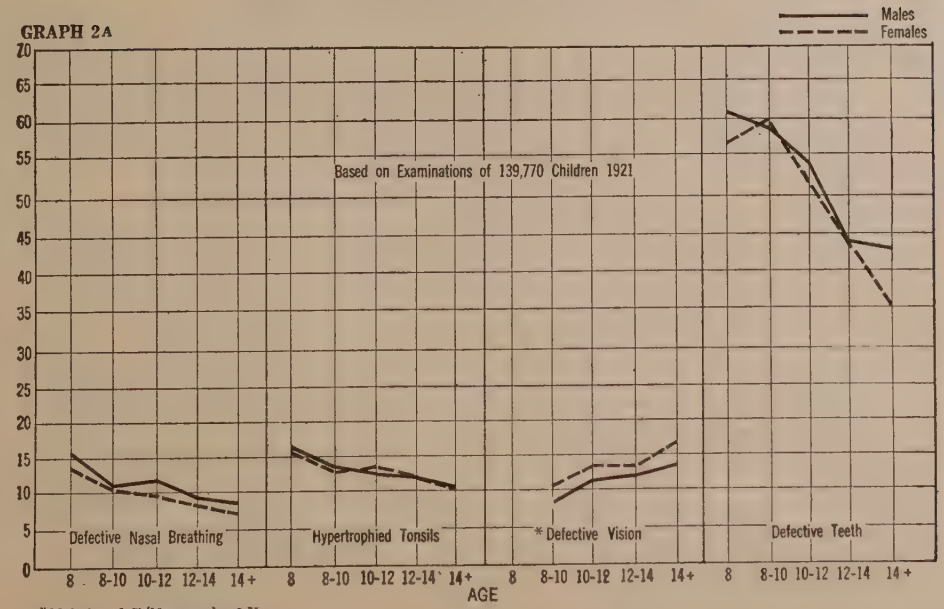
PERCENTAGE OF CERTAIN DEFECTS FOUND IN EACH AGE AND SEX GROUP

GRAPH 2A



Majority of Children under 8 Years not Examined for Defective Vision

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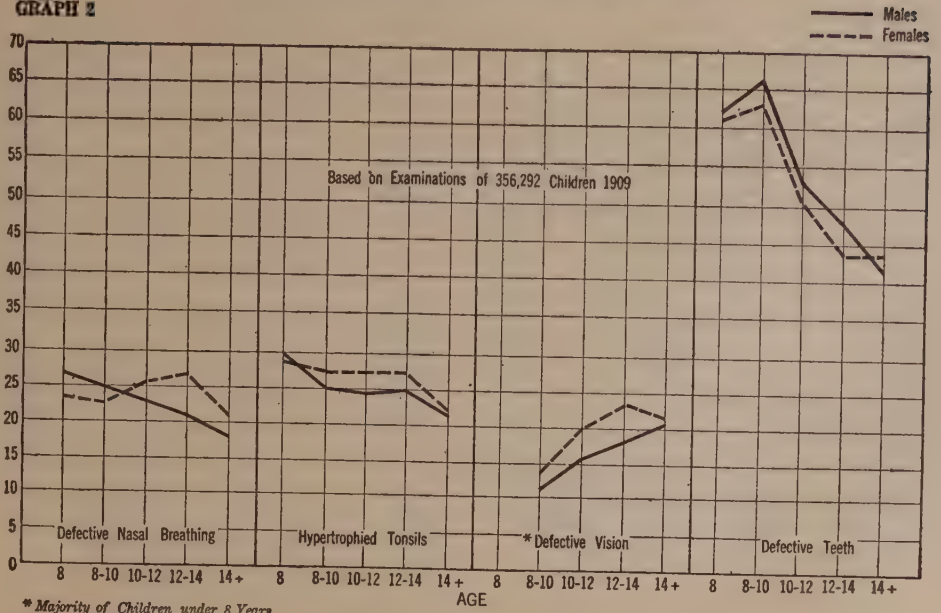
PERCENTAGE OF CERTAIN DEFECTS FOUND IN EACH AGE AND SEX GROUP

GRAPH 2



* *Majority of Children under 8 Years not Examined for Defective Vision*

In the case of defective hearing, the increase is relatively small. In the case of defective vision, the increase is more marked.

(3) Malnutrition, defective nasal breathing (implying the presence of adenoids), hypertrophied tonsils, diseased tonsils, and defective teeth show their highest incidence either at the entering age or at the eight-to-ten-year period, thereafter showing a fairly persistent and regular decline.

(4) While the incidence of physical defects in all age groups is lower in the 1921 study than in the 1909 study, the relative age incidence remains approximately the same, the percentage of defects found at each age bearing about the same relation in both studies.

(5) Considering all of the physical defects in one group, the highest incidence was reached in both studies in the eight-to-ten-year period.

Studies and analyses of this kind are of the utmost importance in determining the proper program for conservation of the health of the child of school age. There are in nearly all of our states laws requiring some form of health supervision. These are either mandatory or permissive. In the states where there are no actual laws for this purpose, some kind of work of this kind is generally carried out.

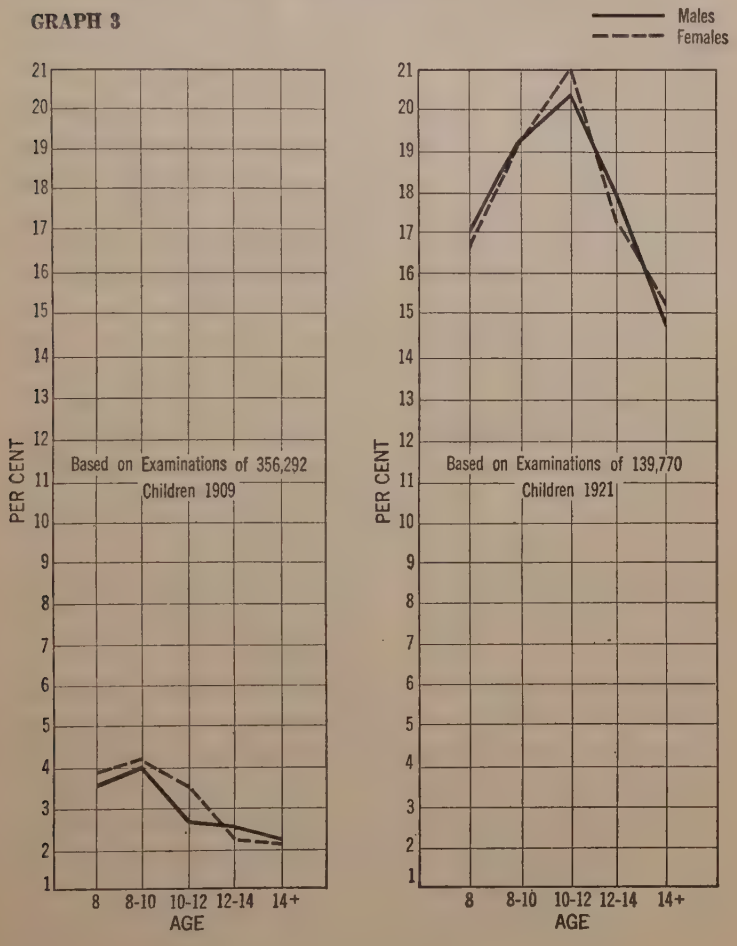
While some of the laws do not mention the number of examinations that must be made of each child during its school life, there are many states where a yearly examination is required. This practice seems to be peculiarly American. England has a school medical inspection system of remarkable efficiency. It is probably the best of its kind in the world, both in methods and in results. England requires a physical examination of the child only at the time it enters school, midway between the first and eighth grades, and again at the time of leaving—three examinations during the school life. The laws in this country, in addition to the

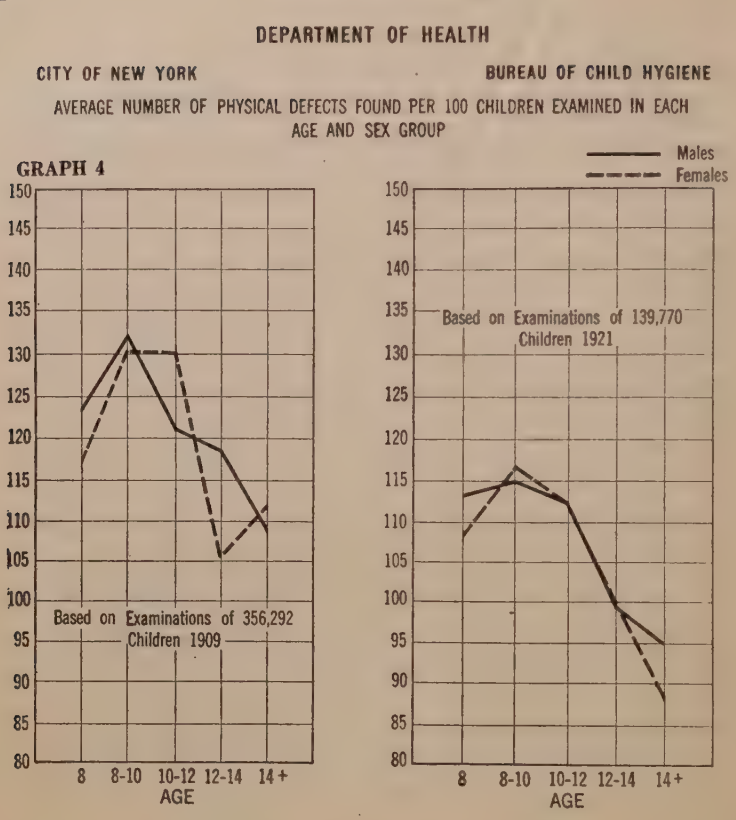
DEPARTMENT OF HEALTH

CITY OF NEW YORK BUREAU OF CHILD HYGIENE

PERCENTAGE OF CASES OF MALNUTRITION FOUND IN EACH AGE AND SEX GROUP

GRAPH 3





requirement of an annual physical examination of each child, are usually so worded that the local communities are required to raise the money necessary for enforcement of the legislation. It is commonly known that few, if any, communities have ever been able or willing to appropriate a sufficient sum so that a complete and careful physical examination may be made of each child each year. The result has been unfortunate. In order to comply with the law, a so-called "examination" has been made. This, however, in most instances has been superficial and hurried, and can hardly be called an examination at all.

We may assume that a thorough physical examination means exactly what is implied by the words. It does not mean a superficial *inspection* of the child; it implies a careful determination of its physical condition, and consequently takes time and inevitably costs money. To carry out annual *inspections* and term them *examinations* is worse than useless; in fact, it may be harmful. *Health inspections* of children, carried out in a routine manner, are of distinct value, but such inspections should be made part of the regular health-supervision system, and once a month is none too often to have them made. Physical examinations are an entirely different matter. In order that these may be of any value, they should be at least as thorough as the examination we would naturally expect a physician to make in his own office.

It is not probable that communities will, for the present, at least, appropriate sufficient funds so that proper physical examinations may be made each year. Moreover, our demand for them has not been based upon any accurate data, but rather upon the inference that the yearly physical examination was essential. This does not mean that a yearly examination for the purpose of finding out the exact physical status of any individual, be it child or adult, is not a good plan. There has been a great tendency recently to extend the idea of a yearly physical examination for both children and adults, and to educate the people as to its importance. Such a yearly examination of each school child is desirable, but until we have sufficient funds to make the examinations in a thorough manner, the money should not be spent on superficial inspections, which have little or no value in determining the health status of the child and afford us scant information upon which we may act for its betterment.

There has been too great a tendency for the public to require, and the authorities to give, statistics of quantity rather than of quality. The inspection of one hundred children may be less worth while than the careful examination of ten children. Until we can spend the amount of money

that is needed for the careful physical examination of each child each year, we should have some definite information upon which to base a program which will afford, within the limitation of our budgets, the utmost protection to the child and the best results, both for the prevention of disease and for its correction, if it already exists.

Studies of the extent of physical defects among school children show that, almost universally, approximately 35 per cent of the children of school age have one or more physical abnormalities, such as malnutrition, defects of hearing, hypertrophied tonsils, adenoid growths, or defective vision. In these 35 per cent are included those who may have defective teeth associated with one or more of the other defects that have been mentioned. As far as defective teeth alone are concerned, statistics are available to show that from 30 per cent to 65 per cent of children who are otherwise normal have teeth that are in some degree defective. We may assume that every child between the ages of five and fifteen years needs dental care. Physical examination of these children will do no more than reveal the dental defects we already know exist. In order, then, to detect the physical defects that exist in 35 out of every 100 children, we annually examine 65 normal children out of every 100, in addition to the 35 who are physically abnormal. This is, of course, a waste of time and there should be some way of determining the method of reaching those children who need attention before we examine the children who are normal.

In order that we may do this it has been necessary for us to know (1) the age and sex incidence of the occurrence of physical defects—that is, at what age they may be found for the first time; (2) how many physical examinations are absolutely necessary during the school life of the child; and (3) the age at which physical examination is most necessary. Some of these questions have been answered in the summary already given of the study in New York City. Further conclusions are: (1) the most important physical

examination to be made in the school life of the child is the one occurring at the time the child enters school for the first time; (2) in order to make the work of health supervision of school children effective a complete physical examination of each child should be made *before* the eight-to-ten-year period. If this can be done, with 100 per cent efficiency, combined with follow-up that is 100 per cent effective and 100 per cent of treatments obtained, it should not be necessary to make regular physical examinations *after* the eight-to-ten-year period, reliance being placed after that time upon the routine inspection of the children in the classroom. This routine inspection will enable the nurse, doctor, or teacher to select the cases of physical defects that may have been overlooked during the routine physical examination, or which may have had their origin after the eight-to-ten-year period; (3) an annual test for defective vision is desirable; (4) unless the amount of money appropriated for school medical inspection is sufficient to allow a complete and thorough physical examination each school year, the officials in charge of such work are not justified in spending any money in having physical examinations made after the eight-to-ten-year period unless the full health needs of the children below that age period have been met; (6) a logical deduction that may be drawn from this study is that more emphasis should be placed hereafter upon the preschool-age period as the time when physical defects should be prevented or corrected in their incipiency; (6) to sum up the matter, this study would seem to show that the expenditure of time and money to make annual physical examinations of school children is not warranted and seems to be unnecessary.

Analysis of the age and sex incidence of physical defects in this study shows that proper and adequate physical examinations made in the early life of the school child—before the eight-to-ten-year period—are essential, and if these are properly followed up and suitable treatment obtained, the appropriation for this work will be spent in the most economical way, the child's health will be more thoroughly

protected, and future disease and the sequelæ of physical defects be more adequately guarded against than by any of the present methods of school health supervision.

Physical Examination by Private Physicians.—One of the criticisms made against school medical inspection is that the examination of the children by the school doctor interferes with the private practice of other physicians. As a matter of record, the statistics of any community will show that a large number of children go to their family physicians for treatment as a result of the physical examinations made at school, and that, in all probability, few, if any, of these children would have been placed under the care of private physicians if attention had not been called by the school doctor to the presence of such defects. In New York City careful studies made on this subject cover a period of several years and show that 48 per cent of all children whose physical defects were treated received the necessary medical or surgical care from private physicians, the remainder being treated at hospitals and dispensaries. It is probable that the proportion of cases treated by private physicians in other communities may be greater than in New York, where the dispensary and hospital facilities are so abundant. Accurate data on this subject are not available, however, and the statistics relating to New York City are given as an indication of the situation as it exists there and may presumably exist throughout the country.

In order to still further obviate the criticism that private practice is being diverted because of the physical examinations in schools, the program of school health supervision should include an opportunity for all physical examinations to be made by the family physician, as the first choice, and they should be made by the school doctor only in case the family refuse to take the child to their own physician. Such a plan would be an economical one for the community and would obviate any criticism that the children were being examined as a routine matter and without regard to the individual preferences of their families.

In 1915 the Bureau of Child Hygiene in the New York City Department of Health instituted a method whereby parents could have a physical examination made of their children by the family physicians instead of by the school doctor. At the beginning of each school term each child admitted to school for the first time is given a circular addressed to the parents, asking them to take the child to the family physician for physical examination and to have him fill out the child's record card, a copy of which is inclosed. By this procedure it was hoped to accomplish the following:

1. A large number of physical examinations of school children by the general practitioners of the city.
2. An increase in the total number of physical examinations made by both school doctors and family physicians.
3. Avoidance of the criticism by other physicians that the school doctors were interfering with their practice.
4. An opportunity to compare the physical findings in children examined by family physicians with those of the school doctors, it being assumed that the conditions for the former examinations were better than those under which the latter must be made.

In the school year 1915-16 a total of 94,462 children admitted to school for the first time received physical examinations. Of these, 15,616, or 16.5 per cent, were examined by their family physicians. In the school year 1918-19, 122,541 children admitted to school for the first time received physical examination, and of this number 8,018, or 6.5 per cent, were examined by their family physicians. This decrease in the percentage of children examined by family physicians has continued until now the total number so examined is insignificant. This result would seem to indicate an increased confidence on the part of the public in the examinations conducted by the school doctors and a possibly better understanding and co-operative spirit on the part of the medical profession.

As it was supposed that the examinations made by the family physicians in their own offices would necessarily be much more accurate than any that could be made by the school doctors, comparisons of the percentages of defects found in these two school years is of interest:

Comparison of Percentages of Physical Defects Found in School Children by Family Physicians and by School Medical Inspectors

	1915–1916		1918–1919	
	Family physicians	School medical inspectors	Family physicians	School medical inspectors
Total examinations	16,203	278,174	6,019	247,375
Defects Found (percentages):				
Defective vision	3.8	8.9	2.3	9.4
Defective hearing	.9	.7	.4	.5
Defective nasal breathing	11.7	10.0	5.7	10.1
Hypertrophied tonsils	20.8	11.6	12.1	13.5
Defective nutrition	10.3	6.3	5.7	14.2
Cardiac defects	1.9	1.5	1.4	1.6
Pulmonary defects	1.5	.3	.6	.3
Orthopedic defects	1.5	.7	.9	.8
Nervous defects	3.9	.7	2.6	.6
Defective teeth	33.8	64.7	19.5	65.2

The Effect of Physical Defects Upon the Progress of the Child in School.—There is clinical evidence that the sick child progresses more slowly in his studies than does the child who is well, but it is dangerous to draw too positive inferences from such evidence. The original mental capacity of the child, his background, his cultural surroundings and opportunities, his general environment and what may be called his "inherent ability," all must be taken

into account. Because it is a practical impossibility to eliminate all of these factors when considering the relation of physical defects to school retardations, the studies that have been made on this subject can hardly be called conclusive. It is not uncommon for certain investigators to select one form of physical defect and, using this as a basis, make a study and draw conclusions as to the effect of this particular defect upon the school progress of the child. This is one of the instances where statistics must be taken with a due amount of caution. Some of these studies may be quoted, however, as showing the trend of thought among school hygienists and educators with regard to this matter. These results are given with no idea of criticism of the individual findings. Whatever criticism there may be should be mainly directed toward the theory back of the studies.

One of the first of these studies, and the one possibly most often quoted, is that entitled "The Effect of Physical Defects on School Progress," made by Dr. Leonard P. Ayres of the Russell Sage Foundation, and printed in the *Psychological Clinic,* May, 1909. Doctor Ayres made a study of the school progress of 20,000 children in fifteen schools in the Borough of Manhattan, New York City. Among these were nearly 8,000 who had been examined by school physicians. Tabulation of the records of these physical examinations had shown that nearly 80 per cent of the children who were of normal age for their grades were found to have physical defects, while only about 75 per cent of the retarded children were defective. The percentage of physically defective children in the lower grades was decidedly greater than in the upper grades. Retabulation of the data by ages showed a very marked and consistent falling off of the number of children having each sort of defect, from the age of six up to the age of fifteen (this finding is in line with the data obtained in the study of age and sex incidence in relation to physical defects already commented upon). Defective vision alone was shown to increase slowly but steadily with advancing age. Doctor Ayres writes:

Moreover, these decreases were not due to the falling out or leaving school of children suffering from defects. This might be put forward as an explanation if we had to do with children above the age of compulsory attendance, or if the characteristic decrease did not take place until the age of fourteen or fifteen; but such is not the case. The children were of from six to fifteen years of age, and the marked decrease began with the eight, nine, and ten-year-old children and continued steadily.

Doctor Ayres drew the further conclusion that age with regard to physical defects was the most important factor in studying retardation, and that retarded children would naturally be older than their fellow pupils in the same grades. He states:

In all cases it will always be true that the "backward" pupils will be the older pupils. Now the older pupils are found to have fewer defects. This is true whether they are behind their grades or well up in their studies. Therefore, it is not surprising that we find that 80 per cent of all children of normal age have physical defects more or less serious, while 75 per cent of the retarded children are found to be defective. This does not mean that pupils with more physical defects are brighter mentally. It simply means that those who are above normal age are older, and that older pupils have fewer defects.

Doctor Ayres retabulated the records of all of those children who were at the ages of ten, eleven, twelve, thirteen, fourteen. There were 3,304 such children, comprising 910 in the ten-year group, 842 in the eleven-year group, 664 in the twelve-year group, 496 in the thirteen-year group, and 392 in the fourteen-year group. The following tables show Doctor Ayres' findings:

A general summary of Doctor Ayres' findings is that (1) in general, children suffering from physical defects are found to make 8.8 per cent less progress than do children having no physical defects; (2) children suffering from enlarged glands and adenoids are retarded most; (3) hypertrophied tonsils, defective breathing, and defective teeth are in general somewhat less serious in their effects; (4) no statistical correlation is shown between progress and defective vision.

PHYSICAL DEFECTS OF 3,304 CHILDREN IN NEW YORK CITY

	Grade								
	1st	2d	3d	4th	5th	6th	7th	8th	Total
Number examined....	33	263	608	892	619	453	299	137	3,304
Without defects.....	6	40	96	260	236	164	87	30	919
Having defects.....	27	223	512	632	383	289	212	107	2,385
Enlarged glands....	12	103	127	99	52	18	13	11	435
Defective vision....	4	64	142	233	157	110	84	39	833
Defective breathing.	6	65	90	90	40	58	35	5	389
Defective teeth.....	17	139	334	364	198	141	77	45	1,315
Hypertrophied tonsils.....	11	81	148	195	104	59	43	18	659
Adenoids.....	5	68	82	108	41	17	17	5	343
Other defects.....	7	56	96	140	36	42	36	14	427

DIVISION OF PUPILS INTO DULL, NORMAL, AND BRIGHT GROUPS BY AGES AND GRADES

Grades	Ages				
	10	11	12	13	14
1.....	dull	dull	dull	dull	dull
2.....	normal	dull	dull	dull	dull
3.....	normal	normal	dull	dull	dull
4.....	normal	normal	normal	dull	dull
5.....	bright	normal	normal	normal	dull
6.....	bright	bright	normal	normal	normal
7.....	bright	bright	bright	normal	normal
8.....	bright	bright	bright	bright	normal

DULL, NORMAL, AND BRIGHT PUPILS SUFFERING FROM EACH SORT OF DEFECT

Ages ten to fourteen, inclusive. All grades.

	Dull	Normal	Bright
Number of children examined	407	2,588	309
Defects per child	1.65	1.30	1.07
	Percentages		
Enlarged glands	20	13	6
Defective vision	24	25	29
Defective breathing	15	11	9
Defective teeth	42	40	34
Hypertrophied tonsils	26	19	12
Adenoids	15	10	6
Other defects	21	11	11
Defective	75	73	68
Not defective	25	27	32

AVERAGE NUMBER OF GRADES COMPLETED BY PUPILS HAVING NO PHYSICAL DEFECTS COMPARED WITH NUMBER COMPLETED BY THOSE SUFFERING FROM DIFFERENT DEFECTS. CENTRAL TENDENCY AMONG 3,304 CHILDREN, AGES TEN TO FOURTEEN YEARS, IN GRADES ONE TO EIGHT

Children having no defects	4.94
" " enlarged glands	4.20
" " defective vision	4.94
" " " breathing	4.58
" " " teeth	4.65
" " hypertrophied tonsils	4.50
" " adenoids	4.24
" " other defects	4.52

In 1914 I made a similar study of 1,541 public-school children in New York City. Of these, 1,202 were found to have physical defects. The percentage of defects found in each age group is shown in the following table:

Number of retarded children with physical defects.... 1,202

Ages	*Number*	*Per cent*
6 years	4	0.3
7 "	20	1.7
8 "	57	4.7
9 "	94	7.8
10 "	121	10.1
11 "	153	12.7
12 "	215	17.9
13 "	223	18.6
14 "	218	18.1
15 "	77	6.5
16 "	15	1.2
17 "	2	.2
Not given	3	.2

The non-promotions in this group are shown in the following table:

NON-PROMOTIONS

Times left back	Pupils with physical defects	Per cent	Total number non-promotions
0	218	18.1	0
1	245	20.4	245
2	250	20.8	500
3	197	16.5	591
4	123	10.3	492
5	78	6.4	390
6	33	2.7	198
7	14	1.2	98
8	6	0.5	48
9	3	0.2	27
No record	35	2.9	0
Total	1,202	100.0	2,589

2.6—Average number of times each child failed of promotion.

When special consideration was given to the children who were retarded in their school progress for one or more years, it was found that 78 per cent of the retarded children had physical defects as contrasted with 30.4 per cent of such defects among children examined in the regular routine of school inspection. The children with defective teeth as the only physical defect show a contrast in inverse ratio as there were only 11.8 per cent of cases of defective teeth, as the only defect, among the retarded children, and 41.5 per cent for the children examined in the regular routine. There were certain contrasts between the incidence of the different types of defects found among the retarded children and the normal grades, as follows:

	Physical examinations of retarded pupils	Routine physical examinations
Defective breathing	20.4 per cent	7.6 per cent
Hypertrophied tonsils	19.2 "	10.4 "
Defective hearing	3.0 "	.5 "
Pulmonary disease	3.0 "	.1 "
Cardiac disease	2.3 "	.5 "
Defective teeth	51.6 "	49.4 "
Average number of defects per child.	2.5 "	1.1 "

In order to eliminate as far as possible other factors with regard to retardation, a study was made of the school records to show the reasons given for the retardation of these pupils. Of the 1,202 pupils with physical defects, the records of 218 gave no information upon which the cause for retardation could be based. The causes ascribed for the remaining 984 pupils are given herewith, it being understood that in many cases a pupil had several factors checked up against him:

REASONS FOR RETARDATION

1. Mentality	232	23.6	per cent
2. Foreigner (recent arrival)	115	11.7	" "
3. Late start	191	19.4	" "
4. Personal illness	270	27.4	" "
5. Illness at home	25	2.6	" "
6. Quarantine	24	2.5	" "
7. Conduct (including truancy)	55	5.6	" "
8. Absence (not specially defined)	81	8.2	" "
9. Frequent change in school	34	3.4	" "
10. Family illiteracy	10	1.0	" "

The results of this study do not, in my opinion, warrant the conclusion that retardation can be definitely ascribed to poor physical condition, but, on the other hand, the proof seems clear that the retarded children had a higher average of physical defects than the children in the entire school group.

Terman, in his book, *Hygiene of the School Child,* comments upon the relation of retardation to school progress. He does not give figures showing the exact progress in school or the terms of retardation of such pupils, but quotes Doctor Warner, who found, in his examination of 100,000 London school children, that 28 per cent of the dull pupils were found ill nourished, and that, conversely, almost the same percentage of the ill nourished were dull. He mentions the fact that children who are deaf may be considered dull, whether they are or not. He draws attention to the value of the proper amount of sleep in keeping up the child's interest and ability for his studies, but he shows that, as a result of intensive investigation of 1,350 children, there was "no correlation, either positive or negative, between sleep on the one hand and intelligence, social status, 'nervous' traits, or any school subject, on the other."

With regard to children found to be suffering from adenoid growths, Terman further states that retardation statistics show that defects of breathing are decidedly more common among retarded children than among those who are up to grade. He compared the physical condition of

1,093 promoted children with that of 303 who failed of promotion, as given by Superintendent Verplanck of South Manchester, England. Mr. Verplanck found that adenoids were one-third more common in the latter group than in the former. In a study of 449 retarded children in the first grade in Elmira, New York, it was found that of those who had been in this grade two years, 19 per cent were affected with adenoids. After commenting upon this and some other studies on the subject, Terman states:

> The teacher should nevertheless bear in mind that adenoids and enlarged tonsils are not responsible for all the dullness found among school children. While marked mental improvement often follows the surgical removal of nasal obstructions, it is vain to hope that stupidity can be universally eliminated by so simple a measure. The badly retarded child is usually mentally and physically subnormal by endowment, and often his physical condition is only a symptom and the abnormality itself the true cause.

Doctor Terman's remark with regard to the effect of the occurrence of adenoids and enlarged tonsils upon the mentality of the child may well be applied to all other physical defects. There is always danger in the enthusiasm that is aroused by intensive studies made by investigators whose purposes are entirely honest, but whose mode of approach is necessarily biased somewhat by the specialty upon which they are concentrating. There can be no doubt that a sick child is almost always a more or less stupid child and that such stupidity as may exist from this cause may be eliminated by proper treatment. The undernourished child is frequently dull, yet, on the other hand, some undernourished children as well as some nervous children are exceedingly bright, and the only difficulty is to hold them back and not let them progress too rapidly. It has been shown in the Ayres and other studies that the occurrence of physical defects cannot be definitely shown to have any positive relation to school progress. We must draw a sharp line between the instances of children who seem dull, but who are really handicapped by some permanent defect such as defective

hearing, and those who are temporarily ill and as a result unresponsive.

It is also important that we refrain from overenthusiastic prognosis as far as school progress is concerned as a result of treatment for physical defects. Extraordinary progress has been shown among children who have been thought mentally defective or of pronounced dullness and who were enabled to go back into their regular grades after the fitting of proper eyeglasses. In my own experience I have known of many children who had been placed in classes for the mentally defective who were able to return to their proper grades in school as soon as their defects of vision were corrected by proper lenses. Instances such as these, however, simply afford the child an opportunity to return to their normal studies. They remove the evidence of seeming dullness. It is improbable, if not actually impossible, that any amount of treatment of physical defects, whether it be fitting of glasses, dental hygiene and treatment, or medical or surgical practice, will transform the truly dull child into a brilliant scholar.

We do not need to rest upon such a premise as a reason why the health care of children is essential. The object of health care of children is that of a well-rounded, physically perfect childhood, so that progress can be made in everything that affects life as a whole. It is desirable to have our children progress rapidly in school, and it is desirable, from an economic point of view, to lessen the expense incident to "repeating" one or more grades. If we choose to view the matter solely from an economic point of view, it is probable that we could, as a result of almost any study, work out a fairly good case to the effect that the cost of physical examination of school children and placing them in proper physical condition would be far less than the cost of re-educating children who are unable to pass their examinations and who must repeat their grades. Such an argument may seem expedient, but if we are truly concerned with the welfare of our children, in the home as well as

in the school, and in their life before they enter school and after they leave it, we cannot rest our case upon any such basis as this. We need health for our children because we wish to have a healthy race of human beings. We want our children to be well because of our interest in them and our love for them, because of our knowledge of the value to the state of a strong and virile population. Whether or not they progress in school rapidly, our children should be well and strong. If elimination of possible retardation offers any argument in favor of universal child hygiene, it may be used for that purpose.

Physical Defects Common in School Children.—In considering physical defects in school children we should keep clearly in mind the relation of a public-health program to the prevention, detection, and correction of these defects. The purpose of our program for child hygiene is to prevent physical defects occurring in childhood, to detect them at as early a time as possible, and to see that children so affected are referred to their own physicians or to hospitals and dispensaries for appropriate treatment. The main emphasis of a public-health program for children should be placed upon *prevention* of disease. Until we attain our ideal in that regard it is probable that we shall have to place emphasis upon the early detection of physical defects. I do not, however, conceive it to be part of a public-health program to include facilities for the correction of physical defects unless such defects cannot be readily cared for by the families, private physicians, hospitals, and dispensaries of any community. Certain types of defects occur in such proportion and are so basic that the problem of their correction cannot easily be solved by concentrating upon the individual. For example, malnutrition, mental defects, and dental defects must, for the present at least, be viewed from the point of view of the group affected. When we view the matter from the preventive aspect, our work must be with the group rather than with the individual.

The objects of school health supervision should be clearly

understood. They are (1) prevention of disease among children and the attaining of such purpose by means of proper community, school, and home sanitation and hygiene, inculcation of health habits in the child, and correction of those conditions which induce disease or physical or mental disability. (2) Only as a temporary expedient should the school health program include the work essential to the detection of physical defects and the provision of facilities for their correction, if the latter are lacking in the community.

When physical defects are found to exist, it is not the province of the school physician to do more than indicate their existence. Fine diagnoses with regard to each defect and suggestion of methods of treatment do not lie within his field. This belongs to the private physician or to the hospital or dispensary while the method of treatment must always be left to the family, acting upon the advice of the physician in charge of the case. As an example, it is essential that the school doctor should be able to determine that the child has cardiac disease or pulmonary disease, but it is not his business to make the fine diagnosis essential to the determination of the type of cardiac disease or pulmonary disease that is present. Such diagnosis requires more time than may be given by the school doctor in the rush of his necessary routine duties. It is sometimes necessary for a child to be examined four or five times before a diagnosis of incipient pulmonary tuberculosis may be made, and the finer differentiation of cardiac diseases may require equally intensive and time-consuming examinations. For this reason, it is the common practice in school medical inspection to use the term "defective nasal breathing" rather than to say that the child has adenoids. A child who is unable to breathe through his nose may have his nasopharynx obstructed by an adenoid growth, but this may not be so. The obstruction may be due to a diverted nasal septum, to the presence of enlarged turbinates, or to a nasal polypus. The school doctor has neither the facilities nor the time to make this differential diagnosis; his concern is with the

fact that the child cannot breathe properly. The *reason* why he cannot breathe properly can be determined by the physician who is to have him in charge for the purpose of correcting the defect. The larger term "orthopedic defects" covers a multitude of finer diagnostic points. Defective hearing may be due to a variety of causes. Any attempt on the part of the school doctor to make fine distinctions will inevitably lead to an unpleasant difference of opinion with the physician who later receives the case. Such controversies are unnecessary and unwise. The purpose of school medical inspection in this regard is served when the attention of the family is called to the fact that the child is abnormal in some specific manner and needs competent and careful attention directed toward the defect which has been noted.

There is a constant tendency to overlook this limitation of the methods of public-health work for children and an equally common tendency for public-health officials to encroach upon private practice in this regard. A similar tendency to go beyond their specific duties is shown when nurses conduct regular clinics in the schoolroom and actually give treatment or prescribe for conditions of ill health or accidents among the children. The school nurse should always render first aid in case of emergency, but she should never thereafter treat a case, but should always refer it to the family physician, or, if the family cannot afford this private care, to a hospital or dispensary. Care must be taken also by the school doctor that this latter procedure is followed. In every instance children should be referred for treatment to their own doctors, and only in the event of extreme poverty should they be referred or taken to a hospital or dispensary for needed care.

The discussion of individual physical defects that follows is based upon the premise we have discussed; that is, that it is the function of school medical inspection, as far as existing physical defects are concerned, to detect them merely as a gross lesion, not to attempt to make any fine diagnosis,

but to call the parent's attention to the fact that the child needs care. The type and character of such care are to be determined by the physician who will have charge of the case.

The method of physical examination of school children has already been discussed. The prevention of these defects has been mentioned, in relation to school hygiene and the improved health status of the school child because of proper care during the period of infancy and preschool age. The matters that need to be spoken of with regard to physical defects are comprised in (1) their extent, (2) their effect upon the health of the child, and (3) methods that should be followed for prevention of such defects.

Adenoids and Hypertrophied or Diseased Tonsils.— For proper nutrition, the body needs a constant supply of fresh, pure air, which should be taken into the lungs through the nasal passages. In order that air may be fit for breathing, it should be clean and of the right degree of moisture and temperature. The nasal passages are so constructed as to afford the means to make this possible. The fine cilia lining the nose filter the air. The tortuous passages, covered with mucous membrane and lined with blood vessels, effectively moisten the air and provide the essential warmth. Thus, air breathed in through the nose and the nasopharynx, does not cause any irritation of the air passages, has the right reaction upon the mucous membrane, and is in condition to be readily received into the air cells of the lungs and by them passed, by means of osmosis, to the blood stream. Also, egress of the air which has received the waste products from the veins of the individual, through the fine capillaries surrounding the air cells, is made possible. Such a brief and imperfect synopsis of the process of breathing is necessarily inadequate, but a more extensive discussion cannot be made here, and the only value of mentioning the process at all is to give a slight background for the reason why we should have the nasal passages open and in healthy condition, so that breathing may be carried on unimpaired.

Anything which occludes the nasal passage, such as the presence of adenoids, deflected septum, nasal polypi, or hypertrophied turbinates, should receive attention. From the point of view of school medical inspection, the fact that the child cannot breathe properly through the nose is the indication that attention is needed.

Another reason why nose and throat conditions should receive attention is that practically all infection enters through the mouth or nasal passages. Proper hygiene of the nose and throat affords one of the best means of prevention of infectious diseases. A normal nose and throat are natural barriers to disease. An abnormal, blocked, or diseased nose and throat afford the best opportunity possible for the inception of disease, particularly that of an infectious nature. Tonsils, if in a healthy state, guard against infection. Tonsils that are full of crypts or that are diseased offer an almost perfect medium for harboring disease germs and furnishing a means of entrance of these diseases into the body. Constant sore throat or tonsillitis, an increased susceptibility to diphtheria, rheumatism, gastric, and intestinal disorders or other serious conditions, may result from the foci of infection which is located in a diseased tonsil. Ear diseases of various kinds may be due to infection as a result of adenoids, the infectious material finding ready access to the middle ear through the eustachian tube.

Occlusion of the nasal passages, preventing breathing through the nose, results in forming the habit of mouth breathing. Mouth breathing may not only lead to permanent deformity and malocclusion of the teeth, but it means that the air is not properly cared for before it enters the lungs, and this increases the liability to infection of various kinds. To a great extent mouth breathing eliminates the sense of smell. The child who habitually breathes through his mouth and whose nasal passages are blocked has his vitality so affected that he is apt to be dull, his nervous stability may be unsettled, he may be irritable or apathetic, and he is constantly liable to contract disease. If, added to this, the ton-

sils are serving as foci of infection for more remote and harmful results, we would seem to have a sufficient argument for the removal of large adenoids and hypertrophied and diseased tonsils.

Enlarged tonsils and adenoid growths are usually associated in the same individual. Adenoids have been referred to as the "third tonsil." The growth of both adenoids and tonsils is fairly constant until puberty; after that time there is a tendency for them to grow smaller, and this tendency is seemingly increased in the case of adenoids by the fact that the nasopharyngeal vault in which the adenoid is situated grows larger as the child grows older, thus affording more room for the adenoid and for the passage of air.

The school doctor needs to differentiate between the normal adenoid and the normal tonsil and those that are abnormal, enlarged, or diseased. There has been a happy indication in recent years of a more sane attitude with regard to adenoids and tonsils. Not many years ago, it was common practice to recommend for removal any tonsil which could be seen, and to infer that if the tonsils needed removal, it was probable that the adenoids should be removed also. The pendulum of opinion on this subject has shown a tendency to swing back. The mere fact that tonsils or adenoids are present is no indication for their removal. The indication for surgical care is the condition of health or disease that is found in these tissues and the presence of any secondary symptoms as a result. If the child is suffering from any form of infection that may be traced to adenoid growth, if he has been subject to earaches or more serious diseases of the middle or inner ear, if his vitality is low and his resistance to disease below normal, if he is undernourished, apathetic, dull or unduly nervous, and if the free ingress and egress of air through the nasal passages is impeded to any noticeable degree, the adenoid should undoubtedly be removed.

It is difficult to outline a constant standard with regard to the attention that should be paid to the enlarged tonsil.

We may assume that if a tonsil is diseased in any way, if its surface is irregular, if the presence of crypts is evident, and if there are any secondary symptoms traceable to possible tonsillar infection, operation for the removal of the tonsils is essential. The hypertrophied or merely large tonsil presents a different problem. As a working rule in the New York City schools, a standard has been devised that if the tonsil reaches only to the pillar of the fauces and is not diseased, it does not warrant operation. If it appears beyond the pillar of the fauces, does not cause any obstruction, gives no secondary symptoms, and is not diseased, operation may or may not be advisable, but usually is not indicated. If, however, it is hypertrophied to the extent of blocking the throat, if the tonsils meet in the center of the throat, if there is interference with the child's speech, if sore throats are common and any indication of irregularity of the surface of the tonsil is present or any definitely diseased condition can be shown, the tonsil should be removed.

A word of caution should be inserted here with regard to operations for removal of adenoids and tonsils. Under no circumstances should these ever be done unless the child is given a general anæsthetic, preferably oxygen and nitrous oxide. Such an operation should not be performed in clinics or dispensaries, but should be considered as warranting hospital attention, the child being received the night before operation, given the necessary preparation, and kept in the hospital at least twelve hours after the operation has been performed. The removal of adenoids and tonsils without anæsthesia causes the child such fright and terror that there is often a serious nervous reaction—one that may persist for many years. Moreover, the ordinary clinical routine is, in many cases, insufficient to prevent secondary infection or secondary or continued hemorrhages.

Causes of adenoids and hypertrophied or diseased tonsils.—The causes of adenoids and enlarged or diseased tonsils is important from the point of view of their prevention. The reasons why tonsils enlarge and become diseased are

not entirely clear. The following factors undoubtedly play a part in their causation: unsanitary and unhygienic living conditions, lack of personal hygiene, imperfect nutrition, and the occurrence of some acute or chronic infection causing inflammation. Tonsils may be enlarged for no apparent reason at all, but diseased tonsils rarely occur without an indication of their cause.

An excessive growth of adenoid tissue may result from the use of pacifiers or from thumb-sucking during infancy, unsanitary and unhygienic living conditions, lack of personal hygiene, too much indoor living, particularly in overheated and overhumid rooms or in an excessively dry and overheated atmosphere. An infectious disease may occasionally stimulate the growth of adenoids.

Symptoms to be Observed.—The easiest and most widely used method of diagnosing the presence of adenoids is to determine whether or not the child can breathe through the nose. Such a test is simple. The nose should be cleared out by means of a thorough but not too vigorous blowing. The child should be required to keep his lips closed. One nostril should then be compressed and the child told to breathe through the other. The process is then reversed, so that the passage of air through either nostril can be determined. If the occlusion is on one side only, it is probably not caused by adenoids. If it is on both sides, some obstruction is indicated. For practical purposes, care must be taken to distinguish between real and apparent obstruction. Many children are habitual mouth breathers through habit. They fail to care for the ordinary normal discharge from the nose and the passage becomes blocked because of this alone. The treatment of this condition is simply re-education in nose breathing, and children who have the habit of mouth breathing should be differentiated from those whose mouth breathing is caused by true nasal obstruction. Symptoms that may be noted and that may indicate the presence of adenoid growths are a stupid, heavy, or dull expression, lack of vitality, poor nutrition, occasional retardation in school, restless attitude,

tendency toward colds. More careful examination may bring out a history of frequent ear trouble or show the presence of an ear discharge. The mouth may be deformed and the teeth crooked. Careful study of home conditions will usually show that the child suffers from disturbed sleep, is apt to snore, and has a finicky appetite. The objective symptoms of enlarged tonsils are not so apparent. There may be the same dullness, apathy, and restlessness, the same indication of low vitality and lack of nutrition, but the diagnosis is only made possible by an inspection of the tonsils. In the school, the teacher should be asked to refer to the doctor any child who habitually breathes through the mouth, who has a discharge from the nose, or whose appearance is dull and apathetic, who seems undernourished and restless, or whose physical condition is generally abnormal without any apparent reason. The mother may suspect her child of having adenoids or enlarged tonsils if his sleep is disturbed, if he habitually snores and is restless at night, if he is subject to night terrors, has a disturbed appetite or lack of appetite, if he is subject to frequent colds or attacks of infectious disease, and if his health between these attacks is distinctly below normal.

Defects of Hearing.—This is one of the physical defects that is more often detected by the teacher than by the school doctor or nurse. This is true because the teacher has better opportunities for continuous observation and slight degrees of deafness may not manifest themselves during the short time covered by the medical-examination period. Occasionally the mother draws the teacher's attention to the fact that the child seems stupid, inattentive, and often dull. In the classroom, the child may show this symptom of inattentiveness by apparent or real inability to hear anything that is said. He may lean forward in his seat, have a strained look on his face, or even turn his head so that the ear giving him the best hearing results is toward the teacher's desk. While defective hearing cannot be considered as one of the major physical defects, complete deafness is so appall-

ing a condition that every possible method should be used to detect these cases in their incipiency.

Defects of hearing are frequently associated with the presence of adenoids and diseased or enlarged tonsils, due to the possibility of infection through the eustachian tube. They may result after attacks of infectious diseases, particularly scarlet fever, or there may be a merely temporary condition of deafness due to the presence of wax in the outer ear. The possibility of cure of real deafness must be left to the attending physician.

In the classroom, the child should be given a seat as near the front as possible and well within the limits of his hearing facilities. If the deafness is pronounced, special provision for his teaching should be made. In large cities, this is done through the formation of classes or schools for deaf children. Such a child should not be brought into competition with children who have normal hearing. If he is of a sensitive nature he will suffer greatly by the comparative readiness with which the other children are able to go on with their work and he will in almost all instances be unnecessarily retarded. If the method of instruction is suited to his infirmity, as it is in the schools for deaf children, his school progress should be as uninterrupted as may be compatible with his mentality.

The detection of defective hearing in schools is unsatisfactory. Two tests have been devised. One—and possibly the most reliable—is the watch test. In order to use this test, each watch must be tested separately. No two watches have the same degree of sound, nor can they be heard at an equal distance. The one that is to be used should be tried out on a number of normal children, and the normal hearing distance when the watch is held directly in line with the ear should be indicated and averaged from various tests on normal children that have been made. This should be entitled the normal hearing distance for the particular watch. The child should be seated during the test and a card should be held at right angles to the face, preventing the child from

seeing the watch when held on the side to be tested. The watch should be held at the normal hearing distance and the child asked if he hears the ticking. If this cannot be heard, the watch should be slowly moved toward the child's ear until the moment when the ticking can be heard.

A common method of recording acuity of hearing is to use the normal hearing distance of the watch as the denominator of the fraction and the actual hearing distance as the numerator. For instance, the ordinary watch may be heard at a distance of twenty inches. If the child hears this watch at a distance of fifteen inches, the fraction denoting his acuity of hearing would be 15/20. Other methods have been devised for recording the acuity of hearing, as, for instance, using the normal hearing distance as the numerator and the actual hearing distance as the denominator of the fraction. Each ear should be tested separately.

For the purpose of the voice test, a room or hall twenty feet long is essential. The child should be placed at one end of the room with his back turned to the examiner. The latter, standing at the extreme other end of the room, at least twenty feet from the child, should repeat slowly, in a whispered voice, numerals or words, slowly advancing until the child is able to hear the words or numerals spoken. In this case, both ears must necessarily be tested at the same time. The degree of acuity of hearing is recorded in the same way as with the watch test, the twenty-feet distance between child and examiner being used as the denominator of the fraction and the actual hearing distance, measured in feet, as the numerator.

Neither of the above tests is satisfactory. It is practically impossible, in the ordinary examining room of a school building, to eliminate the outside noises. Moreover, unless the child is unusually intelligent, it is rarely possible to record the distance at which he can actually hear the watch or voice with any degree of accuracy. The elements of stupidity, inability to understand the language, or shyness must be taken into account. It is probable that a more accurate

diagnosis of defective hearing can be made by the teacher or the family than by any test that can be applied by the school doctor.

Defective Vision.—Reference to already quoted studies on this subject will show that the occurrence of defective vision is the one marked exception to the general rule that physical defects show a tendency to increase in their rate of occurrence from the entering age at school up to the eight-to-ten-year period, and then show a marked and steady decrease. The incidence of defective vision in school life is greater with each succeeding year from the time of school entrance. It is reasonable to conclude that this increase is noticeably influenced by lack of proper school hygiene. In very early life, the other faculties are used to almost the same degree that they are in later life. Vision, however, is used to a far less extent before the school-entering age than it is afterward, and the conditions relating to study and school progress naturally cause a more intensive and continuous vision strain. Here again we have a defect that is more readily observed or detected by the classroom teacher than it may be by either school doctor or nurse. Her opportunities for observation should lead her to an early recognition of every instance of eyestrain or visual defect occurring among children in her classroom. The classical picture of the near-sighted child, leaning over his desk or holding his book within a few inches of his face and peering with a tense expression in order to decipher writing on the blackboard, if once seen, is always thereafter immediately recognized.

The effect of defective vision upon the general health of the child is marked. Dizziness, headache, a sense of discomfort, or even pain in the eyes after any prolonged use, the tendency of the lines of printing to run together or become blurred; itching, smarting or burning of the eyelids; increase in the tear secretion; reddening and inflammation of the conjunctiva and the edges of the lids; and a marked sensitiveness to light—may all be found in varying degrees.

Indirect or reflex symptoms due to eyestrain are commonly those of headache, nervousness, indigestion, and general impairment of health. The fact that the school period covers a large part of the period of active growth and the changes in development of the eyes, as well as other parts of the body, makes eyestrain easy of occurrence at this time of life. In all probability, there is no other organ of the body that is subject to such strain during this developmental period. Reference has already been made to the classification of myopic children as dull, or even mentally defective, when the mentality may be normal, but the ability to see diminished to such an extent that the child is unable to record any visual impressions. Examination of the eyesight of every child suspected of mental defect should be carried out as a matter of routine. Strict adherence to this rule will undoubtedly diminish the number of so-called "mental-defects" and enable thousands of children to lead useful instead of helpless lives.

The responsibility of the school in regard to eyestrain lies in (1) provision of proper lighting of classrooms, (2) proper adjustment of desks and seats, (3) limitation of the hours of actual study requiring close concentration and use of the eyes, either for writing or at the blackboard, and (4) the early detection of incipient eyestrain and defects of vision.

The responsibility of the home includes the same factors that have been mentioned with regard to the school. Avoidance of study at night or in poorly lighted rooms with improperly placed lights is a matter requiring the attention of parents, and faulty habits of sitting or of posture must be guarded against outside of the school as well as within it.

Early detection of defects of vision is the joint responsibility of the school teacher, the school doctor and the school nurse. Annual vision tests should be made of all school children. In certain states the law requires that these be made by teachers; in others, by teachers or nurses. The method of conducting the school tests for detection of de-

fective vision is simple and may readily be taught to even an untrained person.

Types of Defective Vision in School Children.—In emmetropia, or correct vision, the rays of light entering the eye focus directly upon the retina, thus giving a clear and unblurred perception of the object that is seen. The eye is normal in contour and in the position of the lens. It has power of accommodation. In myopia, or shortsightedness, the eyeball is elongated from front to back, and the rays of light converge at a point inside of the retina, thus bringing the object to be seen close to the eye in order to push the focusing point further back. In hyperopia, or farsightedness, the eyeball is shortened from front to back and the rays of light coming through the lens are focused at a point back of the retina, or, in perhaps more accurate terms, the rays of light may be said to reach the retina before they are properly focused. The hyperopic eye, therefore, can see distant objects clearly, but objects that are near at hand are blurred. In myopia and in hyperopia the defect lies in the length of the anterior-posterior diameter of the eyeball. If, in addition, there is an uneven curvature of the cornea or lens, a condition known as astigmatism results. In astigmatism the cornea or lens has different curvatures in different meridians, resulting in blurred or partly blurred images. Astigmatism may combine both the defects—myopia, or shortsightedness, and hyperopia, or farsightedness—that is, the rays of light may focus partly in front of the retina, partly behind it, and partly directly upon it.

Testing for Visual Acuity in School Children.—The tests for visual acuity that may be made in the routine of school medical inspection are more satisfactory in cases of myopia than in either hyperopia or astigmatism. Standard test cards have been devised for this purpose. The Snellen and Allport test cards are probably the best known. These consist of rows of letters of various sizes which are designated by numbers indicating the number of feet at which each line of type should be read if vision is normal. Directions

for the use of these charts usually accompany them. Their use, however, is extremely simple.

The test card should be placed at one end of a room at least twenty feet long and at a height so that it is directly in the line of vision of a child sitting or standing at the other end of the room. Each eye should be tested separately. The eye that is not being tested should be covered by holding a card in front of it. The hand should never be used for this purpose, because of the possible pressure upon the eyeball, interfering with the accuracy of the test. The child should be asked to read the letters from the top down or from the larger type to the smaller. When he reaches the point at which he can no longer read the letters, the number of the line should be noted. The distance at which the child is seated from the chart should be used as the numerator of the fraction which indicates his visual acuity, and the number of the line of the largest type the child cannot read should form the denominator; that is, if at twenty feet the child is unable to read the line marked 30, his visual acuity in that eye would be noted as 20/30.

The charts are inexpensive and, if possible, one should be supplied for every classroom, but should be kept out of sight during the intervals between tests so that the children may not become familiar with the lettering. When testing children who cannot read the English language, or in testing the eyes of very young children, cards which have pictures on them instead of letters may be used, the child being asked to name the picture, whether it be a chair, a table, or other well-known object. For very young children the McCallie test cards have been found useful. On some of the cards there is a small dot or ball, as it is called. The child to be tested is asked to determine in each instance whether the boy, the girl, or the bear has the ball. The use of these picture charts has not proved altogether satisfactory. It might be well if the children in the schools would prepare charts, cutting out pictures from magazines of objects that

are entirly familiar to them, so that they may be easily recognizable in the tests.

Great care must be exercised not to allow stupidity to pass as defective vision. As a general rule, persons who have not had much experience in this line are apt to overestimate the number of defects found, and teachers invariably send in a report of a far greater percentage of cases of defective vision than are found by either the doctor or nurse. So far as possible, the school doctor should check up or re-examine all cases of defective vision reported by the teachers before they are referred for treatment.

The method of testing for hyperopia is too complex to be carried on in the schools. It may be detected mainly by the objective signs that accompany it, of ability to see objects at long distances and inability to see things close at hand; also, by the symptoms of eyestrain that have already been noted. The chart used for testing astigmatism consists of a square card on which are printed heavy black lines radiating from the center. These lines appear of an equal degree of blackness to the normal eye. When certain of them appear lighter in color or gray in tone, it is probable that astigmatism is present. This test is not satisfactory except with intelligent children, and the other evidences of eyestrain should be relied upon to show that there is some defect of vision, leaving the final diagnosis to be made by the physician who will have the case under his care.

After the child has once been examined and his vision found defective, repeated tests should be made at least twice yearly to determine if the glasses provided are correcting the defect.

Strabismus (cross eyes or squint) is readily detected by inspection, no particular tests being required for this purpose. As strabismus may be corrected by the use of glasses, if it is detected at an early enough period, every effort should be made to see that these children are referred to their physicians for care at the earliest possible moment.

Reference to eyesight conservation classes, and their ex-

treme importance as teaching centers, and also for adjusting the school life to the child's needs, will be made in a later chapter.

Defective Teeth.—It is probable that with extremely rare exceptions every person, at some time during his life, needs dental care. This is particularly true during the period of childhood. Estimates made by various communities show that from 60 per cent to 90 per cent of the children examined have one or more defective teeth. Special examinations were made by the Bureau of Child Hygiene of New York City of 500 children between the ages of fourteen and sixteen years applying for employment certificates, for the purpose of determining the extent and possible cost of repair of dental defects that might be found. Ninety-nine per cent of these children were found to need dental attention and it was estimated that, at the lowest cost compatible with decent service carried on in a dental clinic, the average cost of repair work for each one of these children was approximately twenty dollars.

Decayed teeth are important for many reasons. The first and most immediate symptoms are: toothache due to pain, abscess of the teeth, inability to masticate properly, indigestion with consequent malnutrition, absence from school on account of pain, and the possibility of infection from the tooth cavities acting as breeding places for bacteria. There may be enlargement of the glands of the neck, which possibly may go on to suppuration, with discharge and consequent drain on the vitality of the child. There are the more remote results, including chronic indigestion, anæmia, nervousness, general debility, lack of resistance to infectious diseases, endocarditis, possibility of general infection through the adenoids and tonsils, foci of infection from "dead teeth" or those whose nerve pulp has been devitalized, resulting in numerous bodily disorders and diseases. The detection of defective teeth is comparatively simple. Inspection for this purpose may be made by either the doctor, the nurse, or the teacher. Within recent years

this responsibility has been assigned almost wholly to the dental hygienists, if such aids to school health supervision are employed. In the right use of the dental hygienists will probably be found the solution of the problem of prevention of defective teeth.

The causes of dental decay are mainly related to lack of proper diet, both of the mother during the pregnant period and of the child during infancy and early childhood, and improper food and lack of cleanliness of the mouth after the teeth have appeared. Prevention of dental defects is comparatively simple and inexpensive; correction is a complicated and costly process.

Prevention of Decay.—Babies who are breast fed are apt to have much sounder teeth than those who have been bottle fed, the relation being given as 9 per cent of defects in the first teeth of breast-fed babies and 22 per cent in the first teeth of bottle-fed babies. The soundness of the second, or permanent, teeth will depend largely upon the condition and care given the first, or temporary teeth. The development of sound dental tissue is influenced by the care given the expectant mother, with particular reference to her diet.

It is essential that she should have an abundance of foods which contain the lime salts, including cereals, whole-wheat bread, milk, eggs, and green vegetables. The maintenance of her own general health by observance of proper personal hygiene not only assures the baby sounder health, but also helps toward the formation of firm teeth and bones. Absolute cleanliness of the baby's mouth from earliest infancy is essential. As soon as the teeth appear they should be washed after each feeding. A solution of soda bicarbonate, one teaspoonful to a pint of water, applied on a soft linen cloth or a piece of cotton wrapped around the mother's finger, may be used for this purpose, but care must be taken to see that this is done gently so that the mouth may not be abraded or injured. As soon as the teeth are through, a soft tooth brush may be used. By five years—often at three years—a child may be taught to brush his own teeth.

If babies have a tendency toward rickets or any disorder of nutrition, they should be given small doses of cod-liver oil from earliest infancy, and at as early an age as is compatible with their general welfare, cereals, fresh vegetables, eggs, and dried crusts of bread should be included in their diet. As soon as the child is able to chew his food, he should have, at least once a day, some article of food that must be chewed thoroughly. Thorough mastication reduces the number of bacteria in the mouth, by brushing them off the teeth and carrying them with the food into the stomach, where they are destroyed by action of the gastric juice. It also cleans the teeth and affords them the exercise that is essential for growth and soundness. Such thorough mastication also promotes the flow of saliva and renders the food more digestible.

Early extraction of the first teeth should be avoided whenever possible. Children should be taken to the dentist at least once every six months, from the time the first set of teeth are fully erupted, this attention being necessary in order to see that the teeth are well formed, that there is no danger of malocclusion, and that any cavity may receive attention at once.

The school offers probably the best opportunity for the attention necessary to prevent the occurrence of defective teeth. The program should include (1) the teaching of mouth hygiene and such prophylactic care of the mouth as may be carried on by dental hygienists; (2) correction of oral defects by dentists.

The most significant and important contribution to the prevention of dental defects has resulted from the employment of so-called "dental hygienists." The credit for this movement belongs to Dr. Alfred C. Fones of Bridgeport, Connecticut. In 1913 Dr. Fones started a training school for young women, with a course designed to teach them the fundamentals of preventive dental care. In 1915 Connecticut passed a law regulating the training of dental hygienists. In 1916, New York State, and in 1917, Massachusetts, enacted

similar laws. There are now twenty-three States having similar legislation. The best known schools for dental hygienists are those conducted by Doctor Fones at Bridgeport, the Forsyth Dental Dispensary at Boston, Massachusetts, the Eastman Dental Dispensary, Rochester, N. Y., and Columbia University, New York City.

The course usually consists of one year's instruction and requires that the students shall have a previous education equal to at least a high-school entrance period. The students are given didactic and practical instruction in cleaning teeth, and in detecting and charting any defects that may exist. They are not allowed to do repair work, the purpose of their training being wholly prophylactic. When employed in school work each dental hygienist is provided with a portable equipment so that she may go from school to school.

The general program is to have the child entering school for the first time referred to the school dental hygienist. A complete examination of the mouth is made, the teeth thoroughly cleaned, any defects noted, and, if such defects are found, the child is referred to the dental clinic for the proper corrective treatment. The dental hygienists give group as well as individual instruction to the children in mouth hygiene, conducting "tooth-brush drills" and teaching the children, in a simple and understandable way. Charts, posters, and other educational material are used. The importance of good teeth, and how the teeth may be kept sound, and decay or other defects prevented are accentuated. Health habits are inculcated by practical demonstration. The competitive idea, both in the classroom and between individual children, has been found to be of great service. There can be no doubt that the universal employment of dental hygienists would, within a very short time and at slight cost, eliminate the need for dental clinics or repair work, except on the most limited scale. The dental hygienists should re-examine the mouths of the children at periods of not less than six months; more often, if possible. The practical results of this type of work are shown in the fact

that where dental hygienists have been employed, and this continuous and regular care of children carried out, the second or permanent set of teeth in children so supervised have been sound and healthy, and dental defects almost unknown.

Until dental hygienists are more universally employed than at present, dental clinics will probably be necessary. As far as possible, however, such clinics should be maintained on a wholly preventive basis. Except in cases of great emergency, the time of the dentist should not be diverted to the older children, nor should he fill decayed teeth in older children until the needs of all the younger children have been met. When dental clinics are established, the pressure is great to have them wholly occupied with this temporary relief work. It is, of course, the seeming emergent nature of the condition which makes teachers and parents wish to have corrective dental work done, rather than spend the necessary time in prevention of these defects. Unless communities are able to spend almost prohibitive sums of money for the purpose of maintaining sufficient dental clinics to care for the teeth of all children, the only economical way in which permanent good results can be achieved is by insisting that the clinics shall be maintained for the slight repair work necessary for the younger age groups, and this method should be followed in the face of all opposition.

Dentistry has reached a place of such importance at the present time, and has become so specialized, that it is probable that the dental clinic should not carry on more than the simplest forms of dentistry. Orthodontia, which is the treatment by mechanical methods of deformities of the jaw and dental irregularities, must necessarily fall within the province of the specialist. Tooth extraction may be carried on in the schools, but the other and more highly specialized forms of dental care are not within the province of public-health authorities, although it is the duty of the dentist, the dental nurse, or the dental hygienist to see

that children so affected are referred to private dentists for proper care.

It is not probable that schools at the present time will be able to spend any great amount of money on the care of the permanent teeth. This may result, for a period of time, in what may seem to be neglect. A similar situation was met with when communities first began to concentrate their program for the reduction of infant mortality on the problem of keeping the well baby well, rather than curing it after it had become sick. Charges of neglect of sick infants were then common. Notwithstanding this, most communities persisted in their programs, which had for their object keeping the babies well, and the result was an almost immediate decrease in the incidence of illness and death during infancy. The same results may reasonably be expected with regard to any work carried on in the school for the purpose of preventing the present widespread tendency toward dental defects. There may not be the same immediate results, but we may reasonably hope that, within a period of five or six years from the time the dental hygienists begin their work and the methods of prophylactic care are followed, the majority of children in our schools will have sound teeth, and that this condition will be increasingly evident throughout succeeding years.

Disorders of Posture and other Orthopedic Defects

A proper poise of the body is a significant indication of health. A characteristic slouchy position, indicating fatigue and inability to hold the body erect, is seen in cases of undernourishment and impaired vitality, and often comes as a secondary result of the physical defects that have been discussed, particularly those defects which interfere with proper nutrition. Physical training may well be considered an important part of the program for child hygiene, and there should be a closer relation than exists at the present time between departments of physical training and departments of school health supervision. That proper physical

training has made a marked contribution toward improved health during childhood is beyond question. Nevertheless, there seems to have been a tendency to overaccentuate purely muscular development, many of the exercises and games being devised for this purpose. While strengthening of the muscles of the body is of great importance, it cannot be considered wise to do this to the neglect of proper strengthening and development of the internal organs.

Physical training is a subject of such extent and of so specialized a character that it will only be referred to here as it takes its part in a well-rounded system for the promotion of the health of school children. The most significant development in methods of physical training that has taken place in many years is probably that which relates to the attention that is now being paid to improved postural conditions.

The erect position of the human being is a matter of training. Without going too deeply into the question of evolution as applied to human development, we will still accept the many evidences that man does not acquire an erect position naturally or without effort. The strain involved in the maintenance of such an erect position must be relieved at frequent intervals, and people sit down or lie down for the purpose of rest and recuperation from this strain. If an erect position is to be maintained, however, it is essential that the muscles be strong enough to support the bony structure of the body and that the position of the body as a whole be kept in such an axis that the internal organs may remain in their proper position.

Any disease affecting the nutrition of the body, with particular reference to the muscles and bony skeleton, will interfere with the ability to maintain the proper posture. For this reason, in the greatest number of instances, improper posture and the more serious specialized defects which it manifests are the result of an impairment of the general health, due to some specific disorder or physical defect. Conversely, the maintenance of proper posture will, in many instances, so improve the nutrition and vitality of

the child that the occurrence of many of the physical defects, intestinal disorders, and even infections may be prevented, or, if they have already occurred, the maintenance of a correct posture will be of great aid in their correction.

The school is responsible for the development of poor posture and to a great extent it promotes the occurrence of many forms of deformity, classified under the general term of "orthopedic defects."

Spinal Curvature.—Some form of curvature of the spine is exceedingly common during childhood. In its inception it is usually due to faulty habits of standing and sitting. In its early stages it is readily capable of correction. Later, the ligaments and muscles may become so altered or affected that correction is a matter requiring long, tedious and expensive treatment, sometimes requiring the wearing of cumbersome apparatus.

Scoliosis (lateral curvature) is the more common form. Possibly one-fourth of the children of this country have this condition to a greater or less extent. It may range from mere faulty posture or habitual slouch, to a true curvature. In a larger sense, incorrect posture is responsible for the occurrence of this condition. Probably one of the greatest causes is the fact that most of our children are seated in school at desks which are not adusted to their bodily requirements. When the seat and desk are not of proper height or not arranged in the proper relation to each other, the child naturally tries to conform the body to their deficiencies. He sits in a slouchy attitude, with one shoulder lower than the other, and the body thrown to one side. It may be necessary for him to lean over the desk. If any degree of defective vision is present, this contributes to the malposition of the spine and induces some form of curvature, owing to the child's tendency to crouch over the desk instead of sitting erect.

Lordosis (inward curvature) or *kyphosis* (outward curvature) are present to a less extensive degree. They may result from internal disorders, particularly rickets in early

child life. The outward curvatures of the spine may range from a simple case of round shoulders to what is known as "Pott's disease," where there is a definite hump on the back. The latter condition, however, is frequently due to tuberculosis and usually constitutes a permanent deformity. Lordosis, or inward curvature, is not encountered frequently. Its occurrence does not depend upon faulty posture or bad sitting positions and its correction is more difficult.

The prevention of spinal curvature is by means of (1) maintenance of proper posture in standing, (2) prevention or correction of nutritional disorders, (3) proper seating in classrooms. The correct size and arrangement of the school desks and seats have been discussed in the chapter on School Sanitation and Hygiene.

Other Common Orthopedic Defects.—Flat foot is a condition where the ligaments holding the arch of the foot in place have become weakened so that the foot rests as a whole upon the floor instead of having the proper curve under the inner side of the instep. Flat foot may be the result of any condition which weakens the muscles of the legs, as well as other parts of the body, but is more commonly due to ill-shaped shoes and an incorrect position of the body in standing and walking. It is doubtful if the "arch supports" that are so often used for the treatment of flat feet are of any value. They furnish a support for the time being, but do not tend to strengthen the muscles, and their continued use may be harmful rather than helpful. Properly fitted shoes, with low heels, firm soles, and of a size sufficient to allow full play for the foot muscles, are essential during childhood, while the feet are growing. High heels and pointed toes, flimsy materials, and shoes that are too short or too narrow, all contribute toward the occurrence of flat feet. The habit of toeing out is also a contributing factor. Children should be taught to walk and stand with the feet at right angles to the body. The anterior-posterior axes of the feet should be parallel to each other. Habits

of toeing out should be corrected. Properly fitted shoes should be provided, nutritional disorders corrected, and the exercises for proper posture carried out with regularity.

Pigeon breast, knock-knees, and bow-legs are frequently the results of rickets or other nutritional disorders occurring in infancy. The correction of knock-knees and bow-legs is a matter that must be left to the orthopedic surgeon. So-called "pigeon breast" may also occur as a result of continued undernourishment or the presence of adenoids and enlarged tonsils, interfering with proper breathing and the normal development of the lungs. Improvement of the nutrition and correction of bad posture will do much to prevent as well as correct this chest deformity.

Posture.—Miss Jessie H. Bancroft sums up the test of good posture as follows:

> Why should we stand in good posture? If one cares to sacrifice the pride of appearance, is there any other consideration that makes erect carriage of the body desirable or necessary? The answer is threefold and most emphatic: erect carriage of the body is necessary (1) for full vigor and health; (2) to prevent waste of energy in maintaining the upright position in any of the activities of life; and, (3) with children, to admit of proper growth and development. To make plainer what is meant by each of these three points it may be stated at once that only in the perfectly erect position of the body are the great organs of the trunk—heart, lungs, stomach, liver, kidneys, and other viscera that constitute the main working machinery of the body—in a position to perform their work to the best advantage. . . . In a perfectly poised standing position the different parts of segments are so balanced that comparatively slight effort is necessary to maintain the position. In a poor standing posture, on the contrary, an unnatural strain is thrown upon muscles and ligaments, and though the stimulus for this strain may be supplied by unconscious nerve centers, the waste of energy and the general lowering of tone and efficiency in the organism are none the less real. Fatigue comes more readily, inertia is apt to be more apparent, and the general sense of well-being is lessened. Moreover, with this lowered tone of the organism the power of resistance to disease is decreased. The germs of tuberculosis and other infectious and contagious diseases will find lodgment and will flourish in a body whose general tone and power are thus reduced, as they could not in one whose machinery is working to better advantage.

MALE

April 10, 1923
Age 11⅓ yrs.
Weight 60 lbs.
Height 53 in.
Normal wt. 68 lbs.

D Posture

March 4, 1924
Weight 67½ lbs.
Height 55½ in.
Normal wt. 74 lbs.

B Posture

April 10, 1923

Feb. 16, 1924

FEMALE

May 15, 1923
Age 11 yrs. 1 mo.
Weight 84¼ lbs.
Height 59 in.
Normal wt. 91 lbs.

D Posture

Feb. 23, 1924
Weight 97 lbs.
Height 62½ in.
Normal wt. 116 lbs.

B Posture

June 9, 1923

Jan. 26, 1924

From the Clinic of Dr. Armin Klein, Boston

A study which probably will mark an epoch in our understanding of the value of good posture during childhood is now being carried on under the general supervision of Dr. Joel Goldthwaite and Dr. Robert Osgood of Boston, and under the immediate supervision of Dr. Armin Klein of that city. This study is being promoted by the United States Children's Bureau.

In a personal communication describing the methods used, Doctor Klein states:

> We try to have the child acquire co-ordination over his trunk muscles and so give his body proper balance. With this in mind, the patient, after each meal, first relaxes the soft tissue of the back by lying for twenty to thirty minutes on a pad or roll, placed under the apex of the dorsal convexity of the spine. Then while still lying supine on the floor he learns how, by contracting his gluteal and retracting his abdominal muscles, to roll his pelvis and to flatten the exaggerated lumbar curve. Once he has acquired this ability, he is then placed against the wall and is taught to do the same thing while standing up. Then with his chin pulled in and his head back, his chest will of necessity come up. If he has no contracted soft parts now, he will stand with his body at its best mechanical advantage. Should there be some contractures, as, for instance, tightened pectoral muscles, special additional exercises can be prescribed. Most children, however, merely need to be taught how to roll their pelvis, and so to flatten the exaggerated curves of the spine and to hold their heads up and chins in. This is the fundamentally and physiologically proper way to carry the body. With the constant repetition of it during the day the habit of doing it subconsciously is soon acquired. Then the child can be taught to walk, sit, and to do everything with his body held thus mechanically in the most efficient posture.

Although the results of this study are not at this time ready for publication, enough information has been gained to show that habits of right posture can be readily inculcated in children by means of simple exercises carried on for a period of a few minutes each day, under the direction of the classroom teacher. This work can be done at no expense, for teachers may be trained in the methods with little effort. Such a form of work can be carried out universally in all of our schools, the results we may confi-

dently expect are improved general health, greater resistence to disease, proper development of the bony and muscular structures and the internal organs of the body, correction of common disorders such as indigestion, vomiting (whether of sporadic or cyclic character), constipation, improper nutrition. These exercises promote physical well-being in other ways, notably in the maintenance of the erect carriage so essential for health, the normal development and consequent proper working of the various internal organs, the promotion of habits of right breathing and proper lung development, and the prevention of the occurrence of many of our more common types of physical defects.

The importance of proper posture in the prevention of the orthopedic defects that have been mentioned is of paramount importance. For many years Miss Jessie H. Bancroft, Assistant Director of Physical Training of the New York City public schools, together with many orthopedic surgeons, child hygienists, and other interested workers, have contributed largely to introducing methods for maintaining correct posture in childhood. The valuable work of Dr. Eliza Mosher in this direction should be especially commented upon.

There are few methods for the promotion of sound health and prevention of disease or physical defects during childhood which are more easily applied or more certain in their results than the systematic training for correct posture. Such work should take precedence over all others in our methods of physical training and should be universally applied in all schools.

Goiter.—The occurrence of endemic goiter in girls of school age is becoming increasingly prevalent. This is particularly true in certain parts of the Middle West, particularly in what is known as the Lake region. The extent of goiter in some of the Midwestern cities led to prophylactic work being undertaken by Marine and Kimball in 1917 in the schools of Akron, Ohio. Later, other cities took up this

form of procedure for the prevention of goiter, and it is now a routine procedure in a number of communities.

A form of goiter that is commonly present in school girls of ten years and over is of an endemic type. Its etiology has been found to rest upon the fact that enlargement of the thyroid gland takes place when the diet used is deficient in iodine. Given this etiology as a basis, it has been found that the proper administration of iodine in minute doses will prevent and cure goiter, provided it is administered at the proper time and season. Reference to the methods followed and a bibliography on this subject are comprised in an article written by Robert Olesen, surgeon of the United States Public Health Service, and published as part of the Public Health Reports, No. 2, Vol. 39.

Marine and Kimball have consistently maintained that "the most satisfactory method is the individual oral administration of some salt of iodine, either in solution or tablet form." In the Akron schools three-grain doses of sodium iodide were given in the drinking water once each day for two weeks each spring and fall. The disagreeable taste of this solution of iodide of sodium has proved to be of practical importance in preventing its ready acceptation by the girls. Substitution of the iodine and chocolate tablet, originated by the Swiss authorities, has obviated this difficulty. This latter preparation consists of an organic iodide, practically tasteless, and a vegetable fatty acid compound, combined with chocolate in tablet form. Each tablet contains between five and ten milligrams of iodine. These tablets are manufactured by American pharmaceutical houses under conditions which are approved by the Council on Pharmacy and Chemistry of the American Medical Association. One tablet is given each week throughout the school year to the children who need this prophylactic treatment.

A further method has been the use of iodized table salt. The method of preparing this is given by Hirshfelder as follows: "50 cubic centimeters of a 10 per cent potassium iodide solution in 60 per cent alcohol is sprinkled or sprayed

over one pound of ordinary salt. The resulting mixture is stirred, evaporated, ground, or crushed, forming the stock 1 per cent iodized salt. To prepare the salt for consumption, five pounds of common salt are spread in a thin layer, and five teaspoonfuls of the stock preparation are sprinkled evenly from a salt shaker. This mixture may be used for all household purposes, in place of the common variety of table salt. For a more concentrated mixture, to be used exclusively for table use, Hirshfelder recommends the addition of two teaspoonfuls of the stock mixture to one pound of ordinary salt. This latter method has the possibility of being more effective in the more even distribution of the intake of iodine, but it is not so practicable for the purposes of general administration, and the use of iodide of sodium or the iodine chocolate tablets would seem to offer the best method.

Recently, Rochester, New York, has inaugurated a system of supplying the iodine needed to prevent endemic goiter by iodizing the entire supply of drinking water twice each year for two weeks. The method and cost of this procedure are given as follows: The amount of water entering the reservoir is determined at the gatehouse by means of a "thin-edged weir" or dam. As the daily consumption of water in Rochester amounts to 25,000,000 gallons, it is estimated that the addition of 13.3 pounds of sodium iodide daily will be required to provide 1/75 of a grain of iodine to a gallon of that amount of water. With sodium iodide selling at $4.80 a pound, the Rochester authorities estimate that $1,785 a year will suffice to provide the requisite iodization during two two-week periods. A resurvey next year is planned by Rochester to determine the influence of wholesale iodization of the public water supply upon the prevention of endemic goiter.

While endemic goiter is more frequently found in girls than in boys—an estimate of its relative occurrence in six girls to one boy in Akron, Ohio, having been made by Marine and Kimball—in Grand Rapids, Michigan, a sur-

vey showed that only twice as many girls as boys had thyroid enlargement. In some places, notably Switzerland, the sexes have been about equally distributed. In Cincinnati, Ohio, the incidence of goiter has been found to be as six to four in its occurrence, respectively, in girls and boys.

In view of these findings, it would seem that the prophylactic treatment should be applied to all of the children in the schools, including boys as well as girls. The administration of iodine in some form will not only prevent the occurrence of goiter, but will diminish the size of already-existing goiters. Its use has also been found of value during pregnancy, when the administration of iodine to the expectant mother may be expected to prevent the development of goiter in the child as well as in the mother.

CHAPTER XIV

THE MALNOURISHED CHILD AND THE NERVOUS CHILD

"The health, growth, and physical development of children, and to a considerable degree their mental development and progress, depend upon their nutrition."—L. Emmett Holt.

Malnutrition.—The most important of all the basic causes of ill health during childhood is a lack of proper bodily nutrition. It is important to define the term "malnutrition." There is no easy formula that may be used for this purpose, but it is essential that we should differentiate the nutritional disorders which are comprised in the broad term "undernourishment" or "malnutrition" and the lack of nutrition which may be due to starvation. The fact that we have not fixed this differentiation firmly in our thought probably accounts for the confusion which exists at the present time with regard to this matter.

During the World War, and since that time, we have had ample opportunity to be impressed with the condition of so-called "undernourishment" existing among children in many of the European countries. Early in the War, this came to our notice in the form of reports and personal knowledge of the condition of the children in northern France, Belgium, and Serbia. Here we had instances of what amounted to actual starvation, with a resulting stunting of the growth of the children, with immediate lack of resistance to disease and widespread suffering. This form of undernourishment was essentially starvation, and was due, primarily, to actual lack of food. In the later stages of the war, and at the present time, we are concerned with the apparently prevalent

condition of undernourishment occurring in southern Europe, particularly in that part of Czecho-Slovakia which was formerly part of Austria and Hungary, in Russia and in Germany.

There can be little doubt as to the menace of this situation. In the war-torn countries, and those that have not yet recovered a stable political and economic status, the children have been the greatest sufferers. Undernourishment, or semi or almost complete starvation, is prevalent to a degree rarely, if ever, encountered before. This undernourishment seems to be due almost wholly to a lack of food. It is essentially a form of starvation. The results of its continuance will be little short of disastrous, and one hesitates to even estimate the harmful results that may be shown in the next generation if the conditions relative to food supplies of these nations are not speedily corrected.

As a result of this emergent condition in Europe, the methods designed for its control are necessarily equally emergent. The appeal is for food and more food. The methods designed to correct undernourishment mainly center about the provision of nutritious food for the children, not in abundance or quality that we might consider essential, but simply enough food to stave off starvation. Such emergent methods have taken the form of food centers, school lunches, and the public provision of food rations for the children. It has not been a question of providing an ideal form of food, but rather a determination of how little food the child actually needs in order to permit of growth or even to protect his chance of living. For this reason, some of the methods devised in Europe for the determination of undernourishment and for deciding upon the amount of food required for its prevention have necessarily been formulated on a basis which is entirely alien to the principles involved in computing the type of undernourishment that exists among the children of the United States. Reference will be made later to the well-known standards and tests devised by von Pirquet. It may be said here, however,

that much of the criticism of the von Pirquet standards as applied to the children of this country results, not from inaccuracy of the methods when used among the children of von Pirquet's clinic, but rather because the existing conditions among those children vary so widely in their fundamental characteristics from those confronting us among children in the United States.

Undernourishment or malnutrition will, therefore, be considered solely as it relates to the children of this country. The present widespread menance of malnutrition in children has been of insidious growth. From personal experience I can testify as to the inertia of the public, and, indeed, of public-health officials and social workers, to the fact that undernourishment among our children was unduly prevalent and of serious import. Nine years ago, the Bureau of Child Hygiene of New York City called attention to the fact that approximately 21 per cent of the school children of that city had been found to be seriously undernourished. The publication of this statement called forth much adverse criticism, and the accusation was frequently made that the statistics given were unreliable and that the estimate of the prevalence of this condition was grossly overstated. Previous to this time a few workers, notably Dr. William R. P. Emerson of Boston, had realized the significance of this development in our child life, and were working toward a solution of the problem, but the general public, public-health officials, and others were slow to realize the extreme seriousness of the situation. Not until the public consciousness became aroused, as a result of conditions in Europe with relation to the nutrition of children, did there come the reaction which directed attention to the condition of the children of this country in this regard. From that time there has been increased attention paid to the matter, and to-day there is probably no one other subject in the entire field of child hygiene upon which is being centered so much thought and intelligent study as the importance of prevention of undernourishment in childhood.

In the United States our problem of malnutrition has been found to be an exceedingly complex one. Statistics as to its extent vary widely, and this variation holds good within communities as well as between communities. Wood's figures that 20 per cent of the school children in the United States are undernourished probably underestimate the actual conditions. Malnutrition in childhood is seemingly not dependent upon conditions of either city or rural life or upon wealth or poverty. In cities where careful studies have been made, some schools have shown a proportion of as high as 65 per cent to 70 per cent of children who were definitely undernourished. Other schools have shown a relatively low proportion—as low as 8 per cent to 10 per cent. In some rural communities the proportion of undernourishment is distinctly greater than in near-by cities. Some cities show a larger proportion than adjoining towns. Studies made in many places, notably Chicago, Grand Rapids, and New York, have given definite information to the effect that undernourishment among children of school age was distinctly more prevalent among the children of the wealthy or well-to-do than among children in the more crowded tenement districts, who belonged to families whose standards of living were below the so-called "poverty line." It would be possible to quote almost without end, the statistics of the existence of undernourishment, but to do so would seem to be of little practical importance. The varying incidence under different conditions is so great that it is not possible to evaluate them with any reasonable degree of accuracy, or to state with any finality that city children are generally more undernourished than country children, or that the children of the poor are more generally undernourished than the children of the wealthy, or the reverse of either of these two conditions. The reason for this variation in our statistical evidence of the prevalence of undernourishment in children is that, in this country at least, the reason for undernourishment is not one that relates solely to the provision of proper food or methods of feeding. Various authorities sum up the causes of

undernourishment from different points of view. Emerson states that "the five general causes of malnutrition, in the order of their importance, are (1) physical defects, especially nasopharyngeal obstructions; (2) lack of home control; (3) over-fatigue; (4) improper and faulty food habits; and (5) faulty home hygiene."

My own experience leads me to believe that the causes of lack of sufficient nourishment during childhood may be summed up as follows: 1 general causes: (a) heredity; (b) environment, including lack of personal hygiene and insanitary surroundings; (c) various physical deformities, mainly those due to nasal obstruction and the occurrence of adenoids and enlarged tonsils, and including defects of the teeth and of vision; (d) nervous diseases or habitual nervousness; (e) worry and unhappiness; (f) overexcitement and overstimulation; (g) lack of sufficient rest. 2 conditions pertaining to feeding: (a) lack of a sufficient quantity of food, (b) improper food, (c) poor assimilation of food, (d) disturbance of digestion, (e) irregular feeding.

It is essential that in each individual case we ascertain the contributing factors that have caused the undernourishment, and it is equally essential that in any program for the prevention of undernourishment in children, every causative factor must be taken into account. We may assume that proper food and intelligent methods of feeding are essential in order to meet the needs of the growing child, but we must also give due consideration to all of the other causes that have been mentioned, and probably to many more, if our program for the prevention or correction of undernourishment is to be effective. The provision of proper food will not prevent or correct undernourishment if it is not given in the right quantities, at regular periods, and, above all, if the child will not eat it. Probably one of the reasons why undernourishment is so common among children of the well-to-do is because such children may be "finicky" about their food, and either eat the wrong kind or refuse to eat any of it, except in the most minute quantities. The pro-

vision of food, therefore, is not enough. We must see that the child actually eats the food that he needs. Again, a child may have an abundance of proper food, and may eat it, but still be undernourished because of lack of proper outdoor recreation, or because his indoor life is not spent in well-ventilated rooms, either during the day or at night. Again, these two former requirements may be met and the child may be definitely undernourished because he is overstimulated. Late hours, going to the movies, parties, dancing lessons—in fact, any of the more artificial and less natural forms of entertainment—may so excite the child and keep him in such a state of tense emotion that he will show definite signs of improper nourishment.

The importance of sufficient and uninterrupted rest must be taken into consideration. Children may have every other factor in their environment and individual care of a favorable nature, and yet be undernourished because they do not get sufficient sleep or because they have not taken a rest period during the daytime.

One of the more obscure causes of undernourishment is the emotional reaction of the child to his family environment. My own experience has yielded definite knowledge—and I am sure this will be supported by the experience of all pediatrists and other workers with children—that many children are undernourished because of an unhappy or quarrelsome home life. The removal of a child from such an unfortunate environment to one where he is happy and contented, away from the old surroundings to those where he may find conditions peaceful and congenial, will result in such a startling transformation in his nutrition and general state of health that the cause of his previous undernourishment may be determined beyond question.

The occurrence of physical defects, particularly those which interfere with proper breathing habits, such as adenoids or enlarged tonsils, contributes in no small degree toward the occurrence of an undernourished condition. The importance of this contributing factor has been noted by

Emerson, who places it first in his list of the causes of undernourishment. There may be some difference of opinion as to the relative importance of physical defects as compared with other contributing causes of undernourishment, but it is probable that the most important first step that may be taken in placing the child in a condition which Emerson designates as "free to gain" will be the correction of all existing physical defects. Certainly, they are a serious handicap which cannot be overlooked.

The Indices of Nutrition.—The methods used in determining malnutrition have assumed a controversial character. We may concede that the most routine and ready way of finding out whether or not a child is undernourished is to determine his weight with relation to his height, or both these factors may be taken into consideration in relation to his age. Such methods are open to criticism, however, and criticism has not been lacking. The practical importance of this method of determining nutrition lies in its ready application, and because it serves as a convenient method of appealing to mothers and other interested persons. Dr. Thomas D. Wood has published a set of standard tables of weights and heights at different ages for both boys and girls. These have been given widespread distribution through the National Education Association, the Child Health Organization, and the Bureau of Education of the United States Department of the Interior. These tables have probably done more than any other one thing to arouse the interest of the public in the question of undernourishment of children. That their use does not determine with final accuracy either the degree of undernourishment or the actual existence of undernourishment in a certain proportion of cases does not detract from their value when used for purposes of health education and as a ready and available test.

The common way of using the Wood tables is to assume that every child who is 10 per cent under the weight given for height in these tables is undernourished. W. H. P. Emerson, using a more flexible table of standards, believes that

a child who is 7 per cent under the standard weight for his height is undernourished. Recently, new tables prepared by Dr. Wood and Professor Bird T. Baldwin, have been formulated, and are designed to take the place of the Wood tables. Great care has been taken in the preparation of the

WEIGHT-HEIGHT-AGE TABLE FOR BOYS

Height Inches	5 yrs.	6 yrs.	7 yrs.	8 yrs.	9 yrs.	10 yrs.	11 yrs.	12 yrs.	13 yrs.	14 yrs.	15 yrs.	16 yrs.	17 yrs.	18 yrs.	19 yrs.
38	34	34													
39	35	35													
40	36	36													
41	38	38	38												
42	39	39	39	39											
43	41	41	41	41											
44	44	44	44	44											
45	46	46	46	46	46										
46	47	48	48	48	48										
47	49	50	50	50	50	50									
48		52	53	53	53	53									
49		55	55	55	55	55	55								
50		57	58	58	58	58	58	58							
51			61	61	61	61	61	61							
52			63	64	64	64	64	64	64						
53			66	67	67	67	67	68	68						
54				70	70	70	70	71	71	72					
55				72	72	73	73	74	74	74					
56				75	76	77	77	77	78	78	80				
57					79	80	81	81	82	83	83				
58					83	84	84	85	85	86	87				
59						87	88	89	89	90	90	90			
60						91	92	92	93	94	95	96			
61							95	96	97	99	100	103	106		
62							100	101	102	103	104	107	111	116	
63							105	106	107	108	110	113	118	123	127
64								109	111	113	115	117	121	126	130
65								114	117	118	120	122	127	131	134
66									119	122	125	128	132	136	139
67									124	128	130	134	136	139	142
68										134	134	137	141	143	147
69										137	139	143	146	149	152
70										143	144	145	148	151	155
71										148	150	151	152	154	159
72											153	155	156	158	163
73											157	160	162	164	167
74											160	164	168	170	171

Prepared by Bird T. Baldwin, Ph.D., and Thomas D. Wood, M.D.

WEIGHT-HEIGHT-AGE TABLE FOR GIRLS

Height Inches	5 yrs.	6 yrs.	7 yrs.	8 yrs.	9 yrs.	10 yrs.	11 yrs.	12 yrs.	13 yrs.	14 yrs.	15 yrs.	16 yrs.	17 yrs.	18 yrs.
38	33	33												
39	34	34												
40	36	36	36											
41	37	37	37											
42	39	39	39											
43	41	41	41	41										
44	42	42	42	42										
45	45	45	45	45	45									
46	47	47	47	48	48									
47	49	50	50	50	50	50								
48		52	52	52	52	53	53							
49		54	54	55	55	56	56							
50		56	56	57	58	59	61	62						
51			59	60	61	61	63	65						
52			63	64	64	64	65	67						
53			66	67	67	68	68	69	71					
54				69	70	70	71	71	73					
55				72	74	74	74	75	77	78				
56					76	78	78	79	81	83				
57					80	82	82	82	84	88	92			
58						84	86	86	88	93	96	101		
59						87	90	90	92	96	100	103	104	
60						91	95	95	97	101	105	108	109	111
61							99	100	101	105	108	112	113	116
62							104	105	106	109	113	115	117	118
63								110	110	112	116	117	119	120
64								114	115	117	119	120	122	123
65								118	120	121	122	123	125	126
66									124	124	125	128	129	130
67									128	130	131	133	133	135
68									131	133	135	136	138	138
69										135	137	138	140	142
70										136	138	140	142	144
71										138	140	142	144	145

Prepared by Bird T. Baldwin, Ph.D., and Thomas D. Wood, M.D.

When taking measurements, remove the child's out-door clothing, shoes, and coat. Take heights with a square, consisting of two flat pieces of wood joined at right angles (a chalk box will serve). The child is placed in a good erect position, with heels and shoulders against the wall or wide board, upon which has been marked or pasted an accurate measure. Age is taken to the nearest birthday.

Wood-Baldwin tables and they are issued with certain qualifications as to use and interpretation. Among these qualifications is the exceedingly important one of no longer

considering the actual relation of weight to height as the final factor in determining undernourishment but rather as an added factor when all of the other conditions relative to the physical status of the child are taken into consideration.

Another method of determining the standard of nutrition is that devised by Georges Dreyer. Dr. Dreyer states that a person of a certain trunk length (sitting height) should weigh a certain amount, and that, similarly, a person of a certain chest circumference (at rest) should weigh a certain amount. In order to determine the normal weight of a given individual, the method used is to average the weights for the trunk length and for the chest circumference of that person, as given in Dreyer's tables. Age is not considered, the tables being prepared for males and females to apply to any age. Dr. Dreyer's standards are comprised in the following scale with reference to underweight:

(a) deviation of 5 to 10 per cent, possibly abnormal
(b) deviation of 10 to 15 per cent, probably abnormal
(c) deviation of 15 to 20 per cent or more, certainly abnormal.

A third method is that of von Pirquet. Von Pirquet states that the cube root of ten times the weight in grams divided by the sitting height in centimeters should equal 100 in a normal child. This, put in the form of an equation, is

$$\frac{\sqrt[3]{10 \text{ times weight in grams}}}{\text{sitting height in centimeters}} \text{ equals } 100$$

The resulting figures (100 in normal persons) are called "pelidisi," a word which has been coined by von Pirquet to denote the nutritional status of individuals. Tables have been prepared showing the pelidisi for each centimeter of sitting height and each weight. Sex and age are not considered, the table applying to either sex of any age. The table prepared by von Pirquet was published in an article by William E. Carter under the title of "The Pirquet System of Nutrition and Its Applicability to American Con-

Pelidisi Chart (For School Children)

Sitting height in cm.	Percentage—pelidisi											
	85	86	87	88	89	90	91	92	93	94	95	96
55.....	10.0	10.4	10.7	11.1	11.5	11.9	12.3	12.7	13.1	13.6	14.0	14.4
56.....	10.6	10.9	11.4	11.7	12.2	12.6	13.0	13.4	13.9	14.3	14.8	15.3
57.....	11.1	11.5	11.9	12.4	12.8	13.2	13.7	14.2	13.6	15.1	15.6	16.1
58.....	11.7	12.1	12.6	13.0	13.5	13.9	14.4	14.9	15.4	15.9	16.4	16.9
59.....	12.4	12.8	13.2	13.7	14.2	14.7	15.2	15.7	16.2	16.7	17.3	17.8
60.....	13.0	13.4	13.9	14.4	14.9	15.4	15.9	16.5	17.1	17.6	18.2	18.8
61.....	13.7	14.1	14.6	15.2	15.7	16.2	16.8	17.3	17.9	18.5	19.1	19.7
62.....	14.3	14.8	15.4	15.9	16.5	17.1	17.6	18.2	18.8	19.4	20.0	20.7
63.....	15.0	15.6	16.1	16.7	17.3	17.9	18.5	19.1	19.7	20.4	21.0	21.7
64.....	15.8	16.3	16.9	17.5	18.1	18.8	19.4	20.0	20.7	21.4	22.1	22.8
65.....	16.5	17.1	17.7	18.3	19.0	19.7	20.3	21.0	21.7	22.4	23.1	23.9
66.....	17.3	17.9	18.5	19.2	19.9	20.6	21.2	21.9	22.7	23.4	23.2	25.0
67.....	18.7	18.7	19.4	20.1	20.8	21.5	22.2	23.0	23.7	24.5	25.3	26.1
68.....	18.9	19.6	20.3	21.0	21.7	22.5	23.2	24.0	24.8	25.6	26.4	27.3
69.....	19.8	20.5	21.2	22.0	22.7	23.5	24.2	25.0	25.9	26.7	27.6	28.5
70.....	20.6	21.4	22.1	22.9	23.7	24.5	25.3	26.2	27.0	27.9	28.8	29.8
71.....	21.5	22.3	23.1	23.9	24.7	25.6	26.4	27.3	28.2	29.1	30.1	31.3
72.....	22.4	23.2	24.1	25.0	25.8	26.6	27.6	28.5	29.4	30.4	31.4	32.4
73.....	23.4	24.3	25.1	26.0	26.9	27.8	28.8	29.8	30.7	31.7	32.8	33.8
74.....	24.4	25.3	26.2	27.1	28.0	29.0	30.0	31.0	32.0	33.0	34.1	35.2
75.....	25.4	26.3	27.2	28.2	29.2	30.2	31.2	32.3	33.2	34.3	35.5	36.6
76.....	26.4	27.4	28.4	29.4	30.3	31.3	32.7	33.5	34.6	35.7	36.9	38.2
77.....	27.5	28.4	29.5	30.6	31.6	32.6	33.8	34.8	36.0	37.2	38.4	39.6
78.....	28.6	29.6	30.7	31.8	32.8	33.9	35.0	36.2	37.4	38.6	40.0	41.1
79.....	29.7	30.8	31.8	33.0	34.0	35.2	36.4	37.7	38.8	40.1	41.5	42.8
80.....	30.8	31.9	33.1	34.2	35.4	36.6	37.9	39.0	40.4	41.7	43.0	44.5
81.....	32.0	33.2	34.3	35.5	36.7	38.0	39.3	40.5	41.9	43.3	44.7	46.1
82.....	33.2	34.4	35.6	36.8	38.1	39.4	40.8	42.0	43.5	45.0	46.4	47.9
83.....	34.4	35.7	36.9	38.2	39.6	40.8	42.3	43.7	45.1	46.6	48.0	49.6
84.....	35.7	37.0	38.2	39.6	41.0	42.3	43.8	45.3	46.8	48.3	49.9	51.5
85.....	37.0	38.2	39.6	41.0	42.4	43.9	46.4	46.9	48.5	50.0	51.6	53.4
86.....	38.3	39.6	41.0	42.5	44.0	45.5	47.0	48.7	50.2	51.9	53.7	55.4
87.....	39.6	41.0	42.5	44.0	45.5	47.1	48.7	50.3	52.0	53.8	55.5	57.2
88.....	41.6	42.5	44.0	45.5	47.2	48.7	50.4	52.0	53.8	55.5	57.5	59.3
89.....	42.5	44.0	45.5	47.1	48.8	50.5	52.2	53.9	55.7	57.5	59.6	61.2
90.....	44.0	45.4	47.0	48.7	50.4	52.2	54.0	55.8	57.5	59.5	61.5	63.4

Sitting height in cm.	Percentage—pelidisi											
	97	98	99	100	101	102	103	104	105	106	107	108
55	14.9	15.4	15.8	16.4	16.9	17.4	17.9	18.4	19.0	19.6	20.1	20.7
56	15.7	16.2	16.8	17.3	17.9	18.4	18.9	19.5	20.1	20.6	21.2	21.8
57	16.6	17.1	17.7	18.2	18.8	19.4	20.0	20.6	21.2	21.8	22.4	23.0
58	17.5	18.0	18.6	19.2	19.8	20.4	21.0	21.6	22.3	22.9	23.6	24.2
59	18.4	19.0	19.6	20.2	20.9	21.5	22.2	22.8	23.5	24.1	24.8	25.6
60	19.3	20.0	20.6	21.2	22.0	22.6	23.3	24.0	24.6	25.4	26.1	26.8
61	20.3	21.0	21.7	22.4	23.1	23.7	24.4	25.2	25.9	26.6	27.4	28.2
62	21.4	22.1	22.8	23.4	24.2	24.9	25.7	26.4	27.2	28.0	28.8	29.6
63	22.4	23.2	23.8	24.6	25.4	26.2	27.0	27.8	28.6	29.4	30.2	31.1
64	23.5	24.3	25.0	25.8	26.6	27.4	28.2	29.1	30.0	30.8	31.6	32.6
65	24.6	25.5	26.2	27.0	27.9	28.8	29.6	30.5	31.4	32.2	33.2	34.2
66	25.7	26.6	27.4	28.2	29.2	30.0	31.0	31.9	32.8	33.8	34.8	35.8
67	26.9	27.8	28.6	29.5	30.6	31.4	32.4	33.4	34.3	35.4	36.3	37.4
68	28.2	29.1	30.0	30.9	32.0	32.9	33.8	34.9	35.9	36.9	38.0	39.1
69	29.7	30.4	31.3	32.3	33.4	34.4	35.4	36.4	37.5	38.6	39.7	40.9
70	30.7	31.6	32.7	33.8	34.8	35.8	37.0	38.1	39.1	40.3	41.5	42.6
71	32.1	33.1	34.1	35.2	36.4	37.4	38.6	39.7	40.9	42.0	43.2	44.5
72	33.5	34.5	35.6	36.7	38.0	39.0	40.3	41.5	42.6	43.9	45.1	46.8
73	34.9	36.0	37.0	38.2	39.5	40.7	42.0	43.2	44.5	45.7	47.1	48.4
74	36.3	37.4	38.6	39.8	41.1	42.4	43.7	45.0	46.4	47.6	49.0	50.4
75	37.8	39.0	40.1	41.4	42.8	44.1	45.4	46.9	48.3	49.5	50.9	52.5
76	39.3	40.5	41.7	43.1	44.5	45.9	47.3	48.7	50.3	51.5	53.0	54.5
77	40.9	42.7	43.5	44.8	46.4	47.7	49.2	50.7	52.3	53.6	55.2	56.8
78	42.5	43.9	45.2	46.6	48.2	49.6	51.0	52.6	54.3	55.7	57.3	58.9
79	44.1	45.5	46.9	48.4	50.0	51.5	53.1	54.7	56.5	58.0	59.6	61.3
80	45.9	47.3	48.7	50.2	52.0	53.6	55.1	56.9	58.6	60.1	61.8	63.7
81	47.6	49.1	50.6	52.1	54.0	55.5	57.3	59.0	60.8	62.5	64.3	66.0
82	49.9	51.0	52.5	54.1	56.0	57.6	59.5	61.3	63.0	65.9	66.7	68.5
83	51.2	52.9	54.5	56.1	58.1	59.7	61.7	63.5	65.3	67.2	69.1	71.0
84	53.0	54.8	56.5	58.2	60.2	62.0	64.0	65.8	67.7	69.7	71.6	73.6
85	55.0	56.8	58.5	60.4	62.4	64.3	66.3	68.2	70.0	72.1	74.2	76.3
86	57.1	58.9	60.7	62.6	64.6	66.5	68.5	70.5	72.7	74.8	76.9	79.0
87	59.1	60.9	62.9	64.7	66.9	69.0	71.0	73.0	75.2	77.5	79.6	81.8
88	61.2	63.0	65.0	67.0	69.3	71.4	73.5	75.5	77.8	80.0	82.4	84.7
89	63.3	65.3	67.3	69.4	71.6	73.6	76.0	78.1	80.5	82.9	85.2	87.5
90	65.4	67.5	69.5	71.5	74.0	76.4	78.6	80.9	83.4	85.7	88.1	90.5

INSTRUCTIONS FOR USE: To determine the pelidisi, locate in the left-hand column the child's sitting height in centimeters; with a rule, follow the weights in kilograms to the right until the proper figure is reached. Trace upward in that column to the heavy figure at the top, which indicates the pelidisi.

ditions" which appeared in the *Journal of the American Medical Association* for November 12, 1921, and is as follows:

There are numerous other methods devised by various authorities for determining nutrition, but the ones given are possibly the best known.

The final method that will be mentioned, and the one which, in my opinion, is preferable to all of the others, is that of a complete physical examination. There is abundant evidence that, if accurate results are desired, none of the standards mentioned can be wholly relied upon, but must be used in connection with more extensive investigation and examination. In a study made by Dr. Louis I. Dublin and Mr. John C. Gebhart, published in the *American Journal of Public Health,* November, 1923, an extensive comparison is made to determine the accuracy of the different methods used in diagnosing undernourishment. This article, published under the title, "Do Height and Weight Tables Identify Undernourished Children?" comes to the conclusion that they do not, with any final degree of accuracy. Dublin and Gebhart describe an extensive comparative study, based upon the use of the standard Wood-Woodbury tables, used in comparison with the complete physical examination of the child. Various matters, including race, environment, and sex, were taken into consideration. The factors of either 7 per cent or 10 per cent below the weight given for height were also considered.

In this study by Dublin and Gebhart it was shown that, taking the same group of children, careful examination by a physician showed that 34 per cent were malnourished. Using the Wood tables with 7 per cent limit, the number of children found undernourished was 12.4 per cent, and with the 10 per cent limit only 6.2 per cent. In addition to finding that the use of the tables failed seriously in selecting the undernourished children, the authors state that "it is at the youngest ages, moreover, that the worst results are obtained by the use of the standard tables for selecting under-

nourished children. Under age six, only the smallest number of boys would have been selected by the tables; in some cases (age three) as few as 7 per cent of the total by the 7 per cent limit and less than 2 per cent (age five) by the 10 per cent limit. The girls show up somewhat better, but they, too, gave extraordinarily low figures, indicating that among Italian children, at least, good nutrition as diagnosed by a skilled physician can go hand in hand with normal weight or with only slight underweight. In view of the fact that it is among preschool children that so much nutrition work is done, it is particularly unfortunate that the discrepancy between the tables and medical opinion as a basis of selection of undernourishment is greatest.

The standard tables have little or no value for selecting undernourished Italian children. A method which misses three-fourths of all children whom a competent physician after a thorough examination would call undernourished has certainly scant value even as a rough index for sorting out the most needy cases."

Their conclusion is given as follows:

> We may conclude that the use of height and weight tables alone as a guide to the state of nutrition of children is not adequate or sufficiently accurate. The question is: What, then, is the method of choice? The answer, we believe, is as follows: A diagnosis of nutrition should be made in every case only after a careful physical examination by a competent physician. We are well aware that there is still much lack of uniformity in the making of such physical examinations of children. But, as we interpret the tendency of the best medical opinion, it is to make the examination as comprehensive as possible and to make the diagnosis, not on any single item, but rather on a variety of signs or symptoms.

A study entitled "Indices of Nutrition," by Taliaferro Clark, Edgar Sydenstricker, and Selwyn D. Collins of the United States Public Health Service, has been published as Reprint No. 842 from the Public Health Reports, June 8, 1923. These investigators used (a) the standard tables devised by Dr. Thomas D. Wood, (b) the standards devised by Georges Dreyer, and (c) the standards of von Pirquet.

For this purpose 506 children were selected. These children were of all ages from six to eighteen, and were resident in the states of Florida, Georgia, Tennessee, and Utah. The conclusions drawn as a result of this study are given by the authors as follows:

The previous tables and discussion have shown the percentage of this selected group of healthy children who were underweight according to each of the three standards used. Of the 506 children, 102 (20 per cent) were more than 10 per cent below Wood's standard; 65 (13 per cent) were more than 10 per cent below Dreyer's standard; and 87 (17 per cent) were underweight (pelidisi 94 or less), according to the Pirquet standard.

Another study made by Doctor Clark and his associates has been published in a report of the United States Public Health Service for January 12, 1923. The results are given in the following table:

NUMBER OF CHILDREN, BY SEX, JUDGED TO BE WELL NOURISHED OR UNDERNOURISHED (A) ON CLINICAL GROUNDS BY PHYSICIAN AND (B) ON 10% DEPARTURE OF CHILD'S WEIGHT FROM AVERAGE WEIGHT FOR SEX AND HEIGHT, FOR NATIVE CHILDREN IN SOUTHERN COMMUNITIES, U. S. PUBLIC HEALTH SERVICE

	Number said to be well nourished			Number said to be undernourished		
Sex	By physician's diagnosis	By table: less than 10 per cent under average tabular weight	Per cent tabular agreement with physician's diagnosis, using 10 per cent lower limit	By physician's diagnosis	By table: less than 10 per cent under average tabular weight	Per cent tabular agreement with physician's diagnosis, using 10 per cent lower limit
Boys.....	4,174	3,436	82.3	863	377	43.7
Girls.....	4,131	3,270	79.2	805	427	53.0
Both sexes.	8,305	6,706	80.7	1,668	804	48.2

During the school year 1921-22 Dr. J. L. Blumenthal and I made a "Comparison of Methods of Determining Malnutrition in School Children, based upon the pelidisi method, the Wood height and weight scale, and physicial examinations recorded by the Dunfermline scale." This was published in the Monthly Bulletin of the New York City Department of Health in September, 1922. This study covered a group of 1814 children from six to sixteen years of age. Practically all foreign as well as native groups were represented. The conclusions reached were as follows:

1. The determination of degrees of nourishment by means of the height and weight standards according to Doctor Wood's tables shows a lesser incidence (22.2 per cent) than the results of the complete physical examination recorded by the Dunfermline scale (25 per cent).

2. The "pelidisi" of 93 and under shows an excessive percentage of undernourishment that does not seem to be warranted either by the physical examination of the children or by the estimation of their nutrition by the height and weight method, resulting as it does in an average of 33.5 per cent for both sexes. The "pelidisi" of 92 and under, with a total of 22.3 for both sexes, more nearly approximates the condition of undernourishment found by the height and weight tables of Wood, but is less than the total of 25 per cent found by the physical-examination method.

3. The complete physical examination of each child, using the Dunfermline scale as a method of recording the findings, affords a method based upon scientific knowledge and trained medical opinion. The fact that the result of these examinations showed that 25 per cent of the children were undernourished, while the height and weight tables indicated an incidence of 22.2 per cent and a "pelidisi" of 92 and under showed 22.3 per cent, would seem to indicate that physical examination of children discovers some cases of undernourishment which may be overlooked by other methods. It also indicates that a complete examination of the children is possible under the conditions which obtain in school life.

The symptoms of malnutrition that may be commonly determined by the teacher and parent are: the child tires easily; he is apt to be nervous and irritable and cries readily without apparent cause; the appetite is often poor; chronic constipation may be present; the child is nervous, pale, and anæmic; in school he is usually inattentive and cannot con-

centrate on his lessons; he is restless and disturbed, sleeps poorly and tires easily. The general picture he presents is one of extreme fatigue and lassitude.

The doctor's diagnosis of malnutrition will be based on these and many other symptoms, some of which will also be observed by the teacher and parent. Even to an untrained observer the symptoms of malnutrition are not easily mistaken. Probably the most predominant symptom is that of fatigue. These children have an unhealthy pallor; there is a drawn facial expression; dark circles under the eyes and a harsh skin. The child habitually stands in a slouched position, often resting the weight of the body on one foot with one shoulder higher than the other. The physical examinations reveals prominent ribs with a lack of fat between them; winged or protruding scapulæ; hollow chest and protruding shoulders. The muscles are flabby, the eyes lose their normal luster, there is a lack of subcutaneous fat, and there may be motor symptoms such as twitching of the eyelids, tremor of the hands, and even stuttering. If, in addition to this picture, the child is definitely below what may be regarded as the normal weight for his height, the diagnosis of malnutrition is assured. If the weight is normal for the height and any considerable number of these symptoms are observed, the diagnosis is no less certain.

It would seem that, at the present time, the standard tables of height and weight can be considered as having great value for use by teachers or parents in determining in a general way the proportion of children who are undernourished, for purposes of stimulating interest and widespread attention to the needs of our undernourished children, and for affording the easiest means of bringing these cases to the attention of the school doctors or private physicians. They should not, however, be considered more than a general index, and wherever possible should be given their relative value by their use merely as an indication for reference of children to the physician for more extended physical examination.

Another objection that may be found to the standard tables is that with their use a child is simply graded as well nourished or malnourished. Conditions are not as simple as this. Children show varying degrees of nourishment, and, accordingly, need various types of attention. For practical purposes, therefore, it would seem desirable to have some method of more accurately measuring the degree of undernourishment that may be found to exist. Such a method is easily available in the use of what is known as the "Dunfermline scale." This scale is not a standard for judging nutrition, but a method of evaluating the degrees of undernourishment. It is the work of Dr. Alister Mackenzie of Dunfermline, Scotland, and has been published under the auspices of the Carnegie Dunfermline Trust. According to this scale, four grades of undernourishment are distinguished, as follows: (1) EXCELLENT, meaning the nutrition of a healthy child of good social standing; (2) GOOD, indicating a child whose nutrition falls just short of the standard of excellent; (3) REQUIRING SUPERVISION, referring to a child whose nutrition is just beginning to show signs of impairment; (4) REQUIRING MEDICAL TREATMENT, indicating a child whose nutrition is seriously impaired.

When the children are examined they may be placed in any one of these four categories thus affording an easy and convenient method of determining the status of nutrition and the action required for each group.

Measures for Dealing with Undernourishment.—In the prevention of malnutrition, the problem must be dealt with at it affects (a) groups, (b) individuals.

Group Activities.—Nutrition clinics and nutrition classes of various types have afforded an effective method of caring for the child who is already undernourished. The work of Dr. William R. P. Emerson in the organization and program for nutrition classes is probably the best-known instance of this type of program. Doctor Emerson's methods are fully outlined in his book entitled *Nutrition and Growth in Chil-*

dren. Briefly, his method may be summarized as follows: (1) the malnourished child is identified by means of weighing and measuring; (2) a complete family and personal history is obtained from each child, particular emphasis being laid upon general health, health habits, and present symptoms; (3) a complete physical examination is made of each child and all physical defects are corrected; (4) whenever possible, a Wassermann is made for the diagnosis of suspected syphilis, and X-ray examination of the chest is made to discover obscure tuberculosis lesions and the von Pirquet test to rule out tuberculosis. Further clinical or laboratory tests are made as indicated; (5) mental examinations are made in each case, as far as possible, to determine if apparent mental defects are real or the results of undernourishment; (6) social examination is carried on to cover the following points: (a) lack of home control, overfatigue, improper diet and faulty food habits, faulty health habits.

Thereafter, the children are assembled in groups in the classroom. Each child's needs are made the basis of individual study. A health program to cover the school, home, and personal needs of the child is made out and carried out with the co-operation of the teacher and parents. All faulty health habits are readjusted and corrected. Mothers are required to attend the school sessions with the children, and as a general rule lack of co-operation on the part of the mother is considered sufficient reason for excluding the child from class attendance. Special emphasis is placed upon the weight charts that are made out for each child, these charts showing the progress of the child from day to day, and containing such other data as may be necessary to afford a full history of the child's progress. Whenever it is possible, these undernourished children are placed in open-air classrooms, with specified rest periods and adjustment of hours of school work and midmorning and midafternoon lunches. The class is in charge of a nutrition worker who devotes her full time to the group, both in the school and in the home.

The co-operation of the school physician and nurse is essential for the purpose of physical diagnosis and special service in home visits, although the nutrition class is expected to relieve the regular school medical inspection service of much of this responsibility. Close co-operation with the private physicians and clinics of the community must be established. Each child is measured once a year and weighed once each month. On account of the intensive nature of the work carried on, it is rarely possible to care effectively for more than twenty children in such a nutrition class. The results obtained by Doctor Emerson and his coworkers are excellent, and nearly every child in attendance at these classes shows a definite gain and a rapid return to normal condition.

While this method is admirable and should be carried out wherever appropriations warrant, it does not fully serve the purpose of the preventive work that is essential on a large scale if we are to make a perceptible reduction in the present number and possible future cases of malnutrition. The entire child-health program in the schools should tend toward prevention of malnutrition. All of the work which is directed toward improving the health status of the child will inevitably result in a heightened vitality and better nourishment. For the present, however, there should and must be more definite and direct effort made to obtain the desired result. Employment of trained nutrition workers to care for children already undernourished is an impossibility in many communities. Moreover, when so employed, their efforts are necessarily restricted to the care of the child already suffering from malnutrition, and the educational work they are able to do in promoting the health of the rest of the children in the school is necessarily restricted. For this reason, it is essential that we should have some method of reaching all children, both in the school and preschool groups, with the definite and direct object of promoting their nutrition and preventing undernourishment. The school doctor and nurse can do a great deal in this regard by means of

classroom instruction, measuring the children once each term and weighing them once a month, with a complete physical examination of every child entering school for the first time, and thereafter of every child who shows any symptoms, either subjective or objective, of an undernourished condition.

It is the responsibility of the school nurse to see that all physical defects receive appropriate treatment and that the child is given the needed assistance to enable him to make the essential gain in weight and to receive and take advantage of the proper nourishment. The nurse should also readjust the home life of the child so far as possible, not limiting her efforts to children who are physically defective, but carrying on this type of individual health instruction so that it may reach every child. Hours of study, work, and play need to be adjusted. Sufficient rest and sleep must be secured. Overstimulation, overexcitement, and late hours are to be avoided. The sanitation and hygiene of the home and the personal hygiene of the child should be so readjusted that the latter may receive the full benefit of all such aids to health.

Except in rare instances, individual diets need not be prescribed for the children, but when such diets are indicated, the school doctor or nutrition worker should be consulted with regard to their type and application. Continued follow-up work by either the school nurse or nutrition worker is essential. In the school, children already suffering from undernourishment should receive particular attention and are best placed in open-air classes, with a regular rest period and luncheon in the middle of the morning and again in the middle of the afternoon. Children seriously undernourished should be excused from school work, except for a limited period each day, but may well remain in the open-air classroom in order to receive the full benefits of the outdoor life.

In the regular classrooms the need of adequate and free ventilation is evident. Matters of school hygiene and sani-

tation must receive attention. We seriously need more rational adjustment of the school curriculum to suit the health needs of the child. At present we view it from the point of education rather than from health, and education received under such circumstances often results in waste of the teacher's time and the child cannot obtain the full benefit given under conditions which disregard his physical ability.

In the prevention of undernourishment, the schools may co-operate by making provision so that each child may be able to obtain a glass of milk at least once each day, preferably in the middle of the forenoon. The period usually given for lunch, which may be from a half to a full hour, should be increased so that the children may not have to hurry and eat their food hastily, with insufficient mastication. Attention should be paid to the character of the lunches brought from home, and these should be supplemented, in the school, by some one hot food. This may be cocoa, soup, or hot cereal. Such supplementary feeding may be carried on by co-operative effort, the duty of preparing the food being assigned to different groups of teachers and children each week. In rural schools this has been done easily by having each one of the mothers make herself responsible for one or more days for the preparation of this part of the school luncheon, and with the aid of a fireless cooker and a few utensils it has been a comparatively easy matter. The cost of the food can be met by each child paying a share of the actual expense. If in any instance a child is not able to pay his share, the school authorities, with the co-operation of the school doctor or nurse, should find means of raising an emergency fund to cover the deficit.

There is no royal road to the prevention of undernourishment in children. The task ahead of us is a difficult and arduous one, but there is no other that so critically requires our thought and attention. Certainly, it is possible to so adjust our school curriculum that the health needs of the child may be met. It is also easily possible to carry on a campaign of health education, both in the school and in the

home, so that the child's life may be passed under conditions which make health not only probable, but certain. There is no question that the prevailing high incidence of malnutrition can be reduced perceptibly within a short period of time if the health program for children can be carried out in a comprehensive and intelligent manner, and if all matters affecting the health of all the children can receive attention. In such a campaign no detail can be neglected. It is not enough to furnish food for the children. The entire hygiene of their daily life must be investigated and made normal. Such a task is not as difficult as it sounds. With a well-organized system of school health supervision and the co-operation of the teachers, the parents' co-operation will soon be assured, and when these three forces are working in conjunction, the assurance of healthy childhood will inevitably result.

Reference has been made to school lunches. By this is meant a regularly prepared lunch which is served in the school to such children as wish to obtain it. The provision of such a lunch is of undoubted value, in that it gives the child an opportunity to obtain the right kind of food at reasonable cost, and obviates the necessity of a hurried trip home or the eating of unwholesome luncheons at school. The tendency in recent years has been to place less emphasis upon the school lunch as a health measure. If the child receives at least one suitable meal a day, a gain has been made, and to that extent the school lunch is a factor favorable to health.

In our large cities, one of the less favorable results of having school lunches has been that families have considered such a lunch a substitute for home feeding, and instead of the child receiving the school lunch, plus whatever nutritious food he was able to obtain at home, the home supply has been cut down and his total intake has not been increased. The school lunch, however, may have a larger value than the mere feeding of the child. It should serve as a basis of education for the parents. Mothers should be asked to

come to school to investigate the types of food served, and the way in which they are prepared, to learn for themselves the kinds of food the children should take. Such instruction may be given to groups of mothers in the school lunchroom, and in individual cases the information may be carried by the nurse into the home. The eating habits of children are largely influenced by the provision of a proper school lunch. Children who have refused to eat vegetables or cereals or to drink milk at home may be readily taught to do so under the favorable environment of the school. One of the great difficulties in the proper feeding of children is often found in the capricious attitude commonly allowed in all grades of life. Instances are common where mothers come to school and say their children have never been in the habit of drinking milk at home, but since they have been drinking it at school at lunch time, they ask for it at their other meals.

If it is possible to have a school lunch, it should be provided, but it should not be considered a substitute for other methods of child care, nor should it be thought of as the one avenue for the prevention or correction of malnutrition. It is an aid and a very great one, but alone it will not serve.

There is every reason to believe that a whole-hearted attempt to combat undernourishment in this country will be successful. The extent of malnutrition at the present time is the result of the neglect to use the methods already known, rather than because of the need of a new program. As a people we are prone to want our work standardized, and like to have a formula given us that will, if used, prove a panacea. There is no such direct panacea in the prevention of undernourishment, any more than there is in the promotion of child health as a whole. All our child-welfare problems are complex and the only way in which they can be solved is by diligent search for the causative factors, and then an equally diligent care to see that such factors are eliminated.

The Nervous Child.—The nervous child is now beginning to receive the care and attention that he has always

deserved. This attention has been drawn to his needs mainly through the extensive work that has been carried on for the care of the mentally defective child. The line of demarkation between the purely nervous or neurotic child and the one who is mentally defective is not always easy to determine. Nervousness may be purely functional in its character. Mental defect is invariably organic.

The Functional Nervous Disorders.—In all probability about 5 per cent of our school children are definitely neurotic; that is, they are nervously unstable, and consequently are governed more by their emotions than by their mentality or conscious self-control. The entire field of heredity, environment, and child training bear a direct relation to the problem of the nervous child. Within the limitations of an ordinary child health program, it is rarely possible to give this subject the time and attention it deserves, yet it is well within the province of the school doctor, the school nurse, and the teacher to prevent to an appreciable extent the possible development of nervous disorders which used to be considered an incident of adult life, but which we now know have their foundations laid in early childhood. The nervous or neurotic child may exhibit a variety of symptoms, but he always suffers not only in his daily life during childhood, but, if his needs have not been met and if he has not received the essential attention, this suffering may go on as long as life lasts. The designation of neurasthenia as an American disease is based upon a sound premise. To eliminate such nervousness or to prevent its occurrence in childhood should be an essential part of a well-rounded health program.

Causes of Functional Nervous Disorders.—The knowledge of heredity is not sufficiently assured to allow us to assume that children may inherit the nervous tendencies or dispositions of their parents, but the neuroses present in either the father or the mother, particularly the latter, may easily affect the general health and vitality of the child and his emotional stability. Such a child may have what we call a "neurotic constitution." Children of this type are born of

parents who suffer from hysteria, the various neuroses, feeble-mindedness, nervous exhaustion, who are addicts to alcohol, or who are well advanced in years when the child is born. Such children usually manifest their nervous tendencies at an early age; indeed, they may be present in infancy. The nervousness usually increases as the child grows older, and is particularly apt to manifest itself in a severe form during the period of adolescence. The conditions which cause nervousness in the child, other than those which may be attributed to a possible inherent quality, are concerned with the child's environment, his method of training, and his physical condition. Nervous and irritable parents almost always have nervous, irritable children. The child shows the same sensitiveness to his surroundings with regard to the functioning of his nervous system that he does with regard to the condition of his health. Improper personal hygiene for children in their home surroundings, involving late hours, lack of sleep, unhappiness, too much school work at home, few opportunities for healthful recreation, and overstimulation and excitement, may all be considered as exciting causes. Poor nutrition, anæmia, the effects of long illness, any organic disease, attacks of infectious disease, or any prolonged illness may tend toward extreme nervousness throughout childhood.

Symptoms of Functional Nervous Disorders.—The child affected with a functional neurosis shows a many-sided picture. In general, there are two main types. One is the child who is always overexcited, quick to anger, irritable, laughs and talks loudly, and screams and shrieks without sufficient cause. Such children are apt to be unduly boisterous, wish to be active every moment, are constantly egotistical, calling attention to themselves on every possible occasion, and demanding attention from others. They are the children who are unpopular because they are not willing to carry on the usual give-and-take of childhood, but demand all the advantages for themselves and want to be first in everything. They are dominant and aggressive,

restless and never satisfied. They suffer from headaches, have a capricious appetite, and are usually, to a certain degree, physically abnormal. The other type of nervous child presents a contrasting picture. Here we have the apprehensive, oversensitive, shy child. Such a one will not play with other children; he is excessively individualistic; his feelings are easily hurt; he cannot bear blame, and any severity crushes him; he is vacillating, timid and hestitant, and given much to day-dreaming. Usually, too, these children are distrustful of themselves. They have little, if any, physical vitality and cannot carry through any task they have begun. They are apt to cry at the slightest provocation, and almost always show marked indecision regarding anything given them to do. One might go on to an almost unlimited extent in describing the various symptoms shown by nervous children, but enough of these have been mentioned to give an idea of the general type in each marked group. Practically all nervous children have some form of physical defect. Headache is common. They are easily fatigued. The appetite is capricious. There may be indigestion, marked anæmia, disturbance of vision, and careful examination will often show an extremely rapid and sometimes irritable and irreguar heart action. Practically all nervous children are undernourished.

The more concrete manifestations of nervousness in childhood are those known as *chorea,* or *St. Vitus' dance, habit spasm,* and *headache.* The diagnosis of *chorea* is not difficult. There are jerky, irregular twitchings and spasmodic movements of the various parts of the body. There may be grinding of the teeth, twitching of the face, shuffling of the feet, and inability to use either hands or feet. There is no co-ordination of muscular action and the child is not able to control his muscular movements. Chorea has been known as a school disease, because it frequently manifests itself soon after the child enters school. It may be a manifestation of poor nutrition, rheumatism, or even an intestinal autointoxication. The disease is found more often

during the spring months, after the child has been subjected to the unhygienic conditions which are more common during the winter than they are in summer, owing to the lack of proper ventilation, adequate exercise, wholesome outdoor recreation, and too close confinement in school. Closely allied to chorea is what is known as *habit spasm.* This is not a disease, but rather a collection of symptoms. It is easily diagnosed because, although it resembles chorea, the jerky twitching and spasmodic movements are usually confined to the face, neck, and shoulders, and rarely are observed in other parts of the body. Habit spasm is of significance not only for its effect upon the child, but because it is so readily copied by other children, and in that sense it is extremely contagious.

Headache in children is often a nervous disorder. Occasionally spasmodic headaches may be caused by some acute exciting cause, such as an accident, acute illness, or indigestion. Eyestrain is responsible not only for a large proportion of the headaches of childhood, but also for a general nervous condition at the same age period.

Care and Treatment of Functional Nervous Disorders.— The care and treatment that the modern psychologist has devised for the prevention and correction of nervousness in children may only be mentioned. Our concern is with our responsibility for the treatment of these diseases as far as may be possible within the limitations of a child health program. In nearly all cases each child must be considered as an entity. Group treatment is not possible. School work should be adjusted to the capacity of the child. Hours of study should be limited. The child should never be urged to compete with the other children, and in many instances it may be necessary to take the child out of school altogether. Such children sometimes find their best chances in being separated from their parents and placed in an environment which eliminates the irritations often found in the home life and places them under favorable conditions. The correction of all physical defects is essential. An abundance

of fresh air and food are always indicated, and in every way the child should be given the advantages of every method of personal hygienic care. Fortunately, modern psychology has opened the way for a more intelligent treatment of the nervous child than we have been accustomed to in the past. The child needs to be guided and educated, not punished or scolded. He needs an understanding of his problems and a kindly and friendly co-operation in solving them. He may be led, but can never be driven. Attention to his health needs will go a long way in obviating his nervousness, but proper attention to his emotional needs will probably serve a larger purpose. Particularly at the period of adolescence, special care is needed, and girls who are going through this trying readjustment in their lives should have adequate health supervision and the attention that is essential for assuring mental and nervous poise. The forcing of children at this age in their school work has resulted in innumerable breakdowns. The waves of child suicide that astound us from time to time are the inevitable result of lack of understanding of the needs of the adolescent boy or girl. Preventive mental hygiene is assuming the place it deserves, and the more extended application of the rapidly increasing fund of knowledge we have on this subject will lead to the prevention of much unnecessary mental suffering and functional ill-health.

Consideration of the organic nervous diseases of childhood is essentially technical in its nature. The schools are attempting to deal with the problem of the mentally defective child. It is a debatable question whether the school should assume any responsibility in this regard. At the present time there is less difference of opinion than there used to be as to the desirability of placing all such children under institutional care. Certainly they should not be allowed to remain in the classroom with normal children both because they should not be subjected to the pressure which is inevitable and because their effect upon the other children

is always harmful. Proper institutional care for all mentally defective children would seem to offer the wisest possible course. In the school, even when special classes are devised for the purpose of caring for them, they can be under the control of the school for only a limited period each day and for a limited number of days each year. Any unwholesome tendencies that may develop can be only partially controlled. A child with true mental defect is irresponsible, and because of his irresponsibility society should afford a method for his protection. We may differentiate between the moron, with his capacity to do some form of industrial or mental work, and even some slight form of intellectual work, and the more marked types of mental defects such as imbeciles and idiots. The imbecile may be capable of doing some simple form of industrial or mechanical work, but to such a limited extent that he can rarely, if ever, support himself by such means, and institutional care would seem to be indicated. For the type known as "idiots" the institution offers the only solution.

The prevention of mental defect lies in the extension of eugenics. The fact that mental defect is one of the few instances where direct inheritance can be held responsible warrants us in favoring whatever legislation may be necessary to render impossible marriage or the possibility of propagation of the species on the part of mental defectives. Laws for the sterilization of the mentally defective have not proven popular. In the few instances where legislation of this kind has been attempted, its enforcement has been surrounded with great difficulty, but institutionalism for the mentally defective is a possibility and is generally accepted by society as a whole, as the proper solution of the problem.

Certain developmental periods have been assigned as the limit for the different classes of mentally defective. It is generally accepted dictum that morons are those persons who never advance beyond the twelve-year grade of intelligence. Imbeciles are incapable of reaching an intelligence

status higher than that of the seven-year-old normal child, while the idiot cannot develop beyond the intelligence quotient of a two-year-old child. The moron may find his place in our social fabric; the imbecile and idiot must always remain a responsibility which society as a whole must meet.

CHAPTER XV

AIDS IN SCHOOL HYGIENE

Work for children carries with it its own inspiration and in no other field of human endeavor can we be more sure of the value of our efforts.

The program for the conservation of the health of children of school age is constantly developing. This development has been so rapid and extensive that the character of the auxiliary aids that may be included cannot be mentioned in their entirety. There are certain well-organized forms of health work for children which have found the school the most convenient and most valuable avenue for expression. Included in these are open-air classes, sight-conservation classes, classes for children with cardiac disease, classes for crippled children, and classes for the blind and for the mentally defective. Dental clinics and clinics for the treatment of eye diseases and defects are now considered an essential part of the school health program. Health education of children has found its best opportunity in the classroom, and there are numerous programs for this purpose. Among these may be mentioned those of the American Child Health Association, the National Tuberculosis Association, the Boy Scouts and Girl Scouts, the American Association for Mental Hygiene, Health Leagues, American Association for Social Hygiene, the Red Cross, and many others of similar nature.

Extensive use is being made of the invaluable aid afforded by the parent-teacher associations, mothers' clubs, and other co-operating agencies. The training of teachers in methods of health education is becoming a recognized subject in the

colleges, normal schools, and training schools for teachers. Graduate courses for this purpose are being carried on in many of our large universities, the students including graduate nurses, teachers, social workers, nutrition workers, and other health officials. Of no less importance, although possibly with a less immediate relation to the question of child hygiene, are the graduate courses established in connection with some of our large medical schools leading to the degree of doctor of public health, or awarding a certificate of public health. Hospitals and dispensaries are lending their aid not only for the purpose of affording greater facilities for the treatment of children who have physical defects or other abnormalities, but also for the purpose of giving an opportunity for the teaching and training of physicians, nurses, nutrition workers, teachers, social workers, and other persons who wish to have or should have a sufficient groundwork for their public health activities.

Open-air Classes.—The discovery of the germ causing tuberculosis and the value of outdoor life in the treatment of those affected with this disease are responsible for the organization of open-air classes or outdoor classes for school children. Doctor Trudeau may be looked upon as the originator of this method of treatment of tuberculosis, but it is more difficult to give credit to the person who started the first open-air school. It is probable that the original was the one in Charlottenberg, Germany. Following this lead, classes of this type were organized generally throughout Europe. Many of these schools were situated in forests or in extensive grounds, allowing gardening, recreation, and continued outdoor life after school hours. In the United States, the first open-air school of the modern type was established in Providence, Rhode Island, in 1908, and was due to the forethought and organized at the suggestion of Dr. Mary S. Packard, in co-operation with Dr. Ellen Stone and others. Previous to this, the Association for Improving the Condition of the Poor of New York City established at Sea Breeze, Coney Island, a seaside tent camp for the treatment

of children suffering from tuberculosis of the bones and glands. The New York City Department of Education co-operated by sending a teacher to instruct these children. Probably the work of this association may be given priority in the matter of credit for the idea of open-air life for children in its relation to health, but actually the first open-air classroom, as we know it to-day, was the one already mentioned as having been started in Providence. Since then the extension of the open-air or outdoor classroom has been rapid.

In 1908 the Chicago Tuberculosis Institute, in co-operation with the school board of that city, set aside certain rooms in the Graham School to be used for the summer for the open-air treatment of tubercular and debilitated children. Later, the Elizabeth McCormick Memorial Fund of Chicago, first under the auspices of Mr. Sherman C. Kingsley, and later under the supervision of Mrs. Ira Couch Wood, carried on an extensive experimental study of the value of the open-air classroom, and established many of these in connection with the Chicago public schools. New York City also carried on an extensive development in this regard, under the combined co-operation and supervision of the Department of Education, the Department of Health, the New York Tuberculosis Association, and the Brooklyn Bureau of Charities.

Many of the first open-air classes made use of the original classrooms and obtained the necessary fresh air and ventilation by means of specially devised windows. These were hinged at the top, so that they could be swung to the ceiling by means of pulleys or by the use of double-hung windows, so arranged that any number of the sashes or individual panes could be opened separately. Within a short time there came the differentiation between the open-window room and the true open-air classroom, which is entirely outdoors, usually protected on one or more sides by a wall which serves as a windbreak, or in the open country where shelter is provided. This shelter is often little more than a pavilion

with a roof, although it is generally provided with windows on all sides, made in such a way that they can be opened to their full extent, so that the classroom is, to all intents and purposes, entirely out-of-doors. In the construction of all open-air classrooms, the following features have been found essential: (1) proper orientation, providing adequate sunshine, but no direct glare, with the main light coming from either east or west; (2) protection against high winds and continued draughts.

In the conduct and maintenance of these open-air classes, some provision for heating is essential unless the climate makes this unnecessary. Any plan for heating must take into account the necessity of having an abundant supply of fresh air at all times. The usual plan is to construct these classrooms with inclosed kitchen, toilet, and sometimes a dining room, and these may be kept heated with slight difficulty. Proper clothing for the children is essential, and must be suited to the temperature. Such clothing is of various types. It may consist of a bag, completely enveloping the child, with slits for neck and arm outlets. With this a hood is usually worn. A garment known as a *parka* has been used to a great extent. This is a large, enveloping cloak, with hood attached. The difficulty with these two types of clothing is that they restrict the child's bodily movements to a great extent. Later tendencies have been to provide proper clothing by seeing that the child wears warm underclothes, woolen outer clothing, sweater, coat, mittens, and a cap. If necessary, extra woolen boots may be worn over the shoes. Such a costume gives the child more freedom of motion and allows of desk work. For the rest periods, cots or steamer chairs with an adequate supply of blankets should be furnished. Nearly all open-window or open-air classes used exclusively for anæmic, debilitated, or tubercular children include as part of their equipment facilities for furnishing hot school lunches. Additional feeding of milk or cocoa, with crackers, is provided in the middle of the morning and in midafternoon. The true open-air

classroom has been developed in many forms. Many of those located in our larger cities are perfectly equipped and even luxurious in the details of their equipment and furnishings. In some communities *outdoor schools* are maintained. These may be of exceedingly simple type or may have additional buildings to be used in connection with them, with expensive equipment.

The open-window classroom is gaining in favor, which is a matter for congratulation. It has the advantage of being immediately available in any locality; practically no cost is involved in providing special equipment, and it provides facilities for all of the children in the school instead of for a limited number. As far as its relation to the promotion of health is concerned, the open-window classroom would seem to afford all of the advantages that may be derived from the open-air classroom. Reference to the question of open-window ventilation has already been made in the chapter on School Hygiene, and the conclusions which are summarized there apply with equal force in our present consideration of the subject. The open-air classroom may still be desirable for a limited group of children, particularly those who are already tubercular or who come from families in which tuberculosis exists, also for those children who, by reason of cardiac disease, extreme malnutrition, or other serious type of physical abnormality are unable to compete in the rigorous routine of the classroom containing normal children. With this exception, however, it would seem more consistent to spend whatever money and effort are available on extension of open-window classrooms, thus affording the full benefits of fresh air in the prevention and cure of disease to all children, rather than to the limited number that may be accommodated in the more expensive and specialized form of the true outdoor or open-air classes. If open-air classrooms are maintained, or if special open-window classes are provided, the children who should have preference in admission to them may be considered as the following:

(1) those exposed to tuberculosis at home or in whose family there has been a recent death from this disease;
(2) children who have had tuberculosis which is now arrested or cured;
(3) children suffering from malnutrition;
(4) children who become tired easily or show languor or fatigue before the end of the day and who, on this account, are unable to carry on this class work;
(5) children who are frequently absent because of bronchitis or other respiratory disease;
(6) children suffering from nervous diseases, except chorea;
(7) children suffering from cardiac disease.

Children who are actually suffering from tuberculosis should be cared for in a group by themselves, in special open-air classrooms.

Maintenance of Open-air or Open-window Classrooms.—The open-air classroom and certain selected open-window classrooms may be subjected to a more carefully supervised regimen than the ordinary open-window classroom. For those children who are distinctly subnormal, and whose need of open air life is insistent, a definite routine of classroom procedure should be followed. The hours of study must necessarily be limited and interrupted by frequent rest or lunch periods. A practical working schedule is to devote the school day as follows: 9 to 10 o'clock, school work; 10 to 10.30, midmorning lunch; 10.30 to 11, school work; 11 to 12, rest period; 12 to 1, lunch period; 1 to 2.30, school work; 2.30, midafternoon lunch.

There will be few instances found where it is wise to have any definite school work follow the midafternoon lunch. In the special open-window classroom, the routine may be adjusted to suit the needs of the children in attendance. In the ordinary open-window classroom the regular routine of the school may be carried on and supple-

mentary feeding may or may not be provided. The teachers of open-air classes should have special aptitude and liking for this task. It has been the common experience to find that teachers may be hesitant about accepting assignment to open-air or open-window classes, but as soon as they have once had experience in this line, they become its most enthusiastic advocates, and thereafter find it difficult, if not impossible, to go back to teaching in the less well-ventilated rooms.

Before a child is assigned to a special open-air or open-window class he should have a complete physical examination. The teacher and school nurse should co-operate with the physician by having full information of the child's physical condition and special needs, and these classes should be conducted under the direct supervision of the school doctor, who should be constantly in touch with each child's progress, changing the directions essential for the child's care as often as may be indicated. Every child should have a physical examination at least once each month, and should be weighed at least once a week. Loss of weight or constantly stationary weight should be considered sufficient cause for referring the child to the school doctor at once for more continued observation. The complete co-operation of the home is essential and may usually be readily obtained through the efforts of the teacher or school nurse. If the principle of the open-window classroom is applied generally throughout the school, the regular system of school health supervision will be found sufficient.

The effect of this open-air life upon the health of children has been marked. Wherever such classes are maintained, the statistical and clinical data obtained show a continued and marked improvement in the health of the children receiving this kind of care. The children who are regularly in the open-air or open-window classrooms may be expected to improve in mental and physical condition and in their nutrition. They gain in weight; their nervous stability is restored and the progress of nervous disease arrested;

their capacity for school work is increased; absences caused by illness are markedly decreased; there is a lessened possibility of spread of infectious diseases and the actual cases are fewer in number; tuberculosis is prevented or arrested in its development; correct habits for health and feeding are established; and the home environment of the children is greatly improved by force of example.

The value of an abundance of fresh air as far as the health of children is concerned is of such fundamental importance that it should be given the attention it deserves. The hesitancy of any community to give children this opportunity because of the cost of maintaining open-air classes need no longer act as a deterrent. Except for a limited number of children, the open-window classroom will be found to give all the advantages of the open-air classroom, with no interference with the routine of the school as a whole. There may be need of simple adjustment of this routine in a few classrooms. The extra clothing needed because of the lower temperature may almost always be provided by the individual families. The open-air classroom is in a certain sense an anachronism; the open-window classroom is essential in a properly developed program for the health of the child of school age. It is to be hoped that the present tendency toward maintenance of open-window classrooms will become universal in its application. When this has been achieved, the larger part of any problem we may have with regard to prevention of disease in children will have been solved.

Sight-conservation classes.—Sight conservation is a matter of comparatively recent development. Clinics for the treatment of diseases of the eye have been maintained in many communities for a definite period of years. These clinics were started primarily for the treatment of acute infectious eye diseases, notably trachoma. As trachoma decreased in incidence, and as the work of the school nurse practically eliminated the spread of the infectious eye diseases, school health authorities became increasingly aware

of the lack of facilities for corrective or preventive work in connection with defects of vision. In general, the clinics or hospitals of any community have not been able to cope with this need. Correct refraction of the eyes of children may be, and often is, a long-drawn-out and tedious process. Where school health supervision is carried out in any adequate manner the facilities afforded by the various eye clinics of the community are soon exhausted, leaving a large number of children who cannot afford to go to private physicians or obtain the services of ophthalmologists, and who, therefore, often have their eyesight definitely injured by the use of self-fitted glasses or lack of treatment of any kind. So-called "eye clinics" are therefore being increasingly devoted to refraction work, and it is not uncommon, in our larger cities at least, to find groups of ophthalmologists employed for this purpose. Probably the first sight-conservation clinic was that started in New York City under the direction of the Bureau of Child Hygiene in 1918. The purpose of this clinic was to examine all children who had been assigned to classes for the blind and to attempt to save whatever power of vision remained. It was found that a definite proportion of children who had been considered wholly blind could be given glasses which enabled them to have a marked degree of vision, even if complete correction could not be obtained. Such children were no longer candidates for the classes for the blind. On the other hand, they were not entirely fitted to do ordinary classroom work. This situation led to the establishment of special classes for children who were handicapped by a type of defective vision that could not be wholly corrected by the use of glasses. As a natural sequelæ to the establishment of these special classes, the eye clinics have found it necessary to devote a greater proportion of their time to the many problems involved in the conservation of the sight of these children who have serious defects of vision.

It was found that if these children were to do school work to any definite extent, repeated examinations of their vision

would be necessary. The importance of this work may be gleaned from the available statistics, covering a short period, of the work of the sight-conservation classes in New York City. Out of the first group of 2,000 children who were considered either totally or partially blind, 110 were definitely assigned to the classes for the blind, 845 were assigned to the sight-conservation classes, and the remainder were able to obtain such a degree of correction of their defective vision that they could go back to their regular classroom work. When one considers that probably the entire 2,000 children would have been permanently assigned to classes for the blind, and that the little eyesight they had would soon have disappeared entirely, the success and value of this remarkable experiment in the conservation of eyesight is clearly apparent. Dr. M. B. Beals, supervising oculist of the New York Bureau of Child Hygiene, should be given full credit for the inception of the idea of the sight conservation work. Doctor Beals not only suggested the use of the eye clinics for this purpose, but he is responsible for working out the technique and methods to be followed.

The procedure for the establishment of sight-conservation classes will naturally vary in different communities. A program which has been found to be effective is as follows: First, all children found by the school doctor to have a vision in the better eye of 20/70 or worse are considered candidates for the sight-conservation classes. Such children should be referred to the school oculist for further examination. If the vision can be improved better than 20/50 by glasses or treatment, the child may be placed in a regular classroom unless, in the opinion of the oculist, the work in the sight-conservation classes promises better opportunity for the conservation of any remaining vision. In all instances where children with this markedly impaired vision are referred to regular classrooms, the teacher is fully instructed by the oculist as to the extent to which the eyes may be used, the necessity for continued use of glasses, and the

intervals at which the child should report to the oculist for re-examination.

The sight-conservation class is necessarily restricted in the number of children received. Also, because the children will be of varying ages, the type of instruction that may be carried on must necessarily include the different school grades. These classrooms should be equipped with special large print blocks, raised maps, books with large type specially made large-size blank books so that the child may write or print the letters of large size, sometimes an inch or more in height. These classrooms must be situated so that they will have the very best lighting facilities. Blackboards must be kept absolutely clean and never subjected to cross glare of light. The child's work must be suited to its individual capacity and degree of vision, and this must be prescribed by the school oculist. The co-operation between the teacher and the oculist must be absolute.

The results obtained with these children of normal mentality but markedly defective vision are most encouraging. Almost without exception these children are enabled to go ahead with their normal school work, although it may take a greater length of time for them to complete the specified grades. There are numerous individual cases on record where the vision has been improved from 20/70 to 20/30 and a large number of cases of children whose vision has been improved from 20/100 to 20/40. In one instance a boy's vision improved from 20/200 to 20/30. In one class of twenty of these children, there were seven whose grade work was either in advance of or equal to the best in the classes of normal children.

Another group of children whose after-life has been immensely affected by the work of the sight-conservation classes are those who have been considered mentally defective. In one such group of 132 definitely ungraded or mentally defective, 34 were found to be normal mentally after their eyestrain had been relieved and proper glasses provided. In a group of 400 habitually retarded children found in one

of the large New York City schools, it was found that more than 100 had decided refractive errors. Glasses were prescribed for 110; of these, 100 procured glasses, and in less than three months 98 out of these 100 passed the regular school examinations, many skipping a definite number of intermediate classes. One boy who had been far behind his grade for age passed over five grades on his examinations. Of the ten who did not have glasses fitted, only one was promoted.

Classes for Children with Cardiac Affections.—Cardiac disease as a whole forms one of the most prominent causes of death at all ages. In New York City at the present time deaths from cardiac diseases are greater than those from all forms of tuberculosis. While this condition may not obtain in all parts of the United States, the fact remains that the death rate from the various cardiac diseases is so high at the present time and is so defintely on the increase that immediate attention should be directed toward any methods that may be used for prevention of its occurrence.

An indication that the relative frequency of heart disease is as great in childhood as it is in later life is shown by studies made in New York City of a large number of food-handlers. About 2 per cent of them were found to be clinical heart cases. From 1.5 to 2 per cent of the school children of that city are found to have some cardiac disorder. It has been estimated that about 2 per cent of life-insurance applicants are rejected because of cardiac disease. The only deviation from the remarkable uniformity of these figures are those of the draught statistics, where about 5 per cent of the men were rejected because of heart disease. That there is a slight increase, however, from the early age groups is shown by the figures already quoted with regard to the age and sex incidence of physical defects found in school children. The examinations used as a basis for these statistics showed that the incidence of heart disease is about twice as great at the ages of fourteen and over as it is at the age of eight to ten years.

The necessary limitations of the type of physical examination made by the school doctors result in inclusion of cases designated as heart disease of those of both a functional and an organic character, the final and more detailed diagnosis being left to the private physician. From this we might naturally draw the inference that the cases of actual organic heart disease in the schools are less than the figures given would indicate, but repeated surveys made by private physicians and organizations interested in the control and prevention of heart disease show that this overestimation is more apparent than real.

A survey made some years ago by the Association for Prevention and Relief of Heart Disease showed that out of 130,000 children, 0.7 per cent or seven out of every 1,000 children physically examined had a definite heart defect. Approximately half the total number afflicted with heart disease were rated in Class I of the category adopted by the association—that is, they were considered to have organic heart disease, but were able to carry on their habitual physical activity. Slightly more than one-third fell into the second group—those who could carry on with slightly diminished physical activity. Seven per cent were in the third group, who, for their physical welfare, must diminish the amount of their activity, and 1 per cent in the fourth group, who could not be permitted any physical activity whatever. The commission drew the conclusion that "in other words, in a school population of 10,000, there would be probably about 70 children who had heart disease, but 64 of these could probably go along under supervision with little or no limitation of exercise." Holt has estimated that 2½ per cent of the child population of school age has cardiac disease. Careful and detailed examinations made of certain groups of public-school children for the purpose of selecting those who might be suitable to be received in cardiac classes have shown the occurrence of 2.3 per cent of children with definite organic heart disease. A similar large number of examinations conducted by Dr. William P. St.

Lawrence in one of the public schools of Manhattan Borough, New York City, resulted in finding that 2 per cent of the children had cardiac defects.

The marked interest in cardiac classes, or classes conducted with particular reference to the needs and care of children with heart disease, has come about because of the great difficulty of giving these children individual care. Children so affected are seriously handicapped when placed in direct competition with normal children. Climbing of stairs, play, both supervised and unsupervised, athletic games and contests, and fire drills with rapid dismissal, all furnish conditions which cannot be met with safety by the child who has any cardiac disease. The argument in favor of having special classes for these children is that it affords an opportunity for placing such a classroom on the first floor of the school building, that the exercise and play of the children can be carefully supervised, that there is no incentive for competition with children who are physically sound, that the school work may be adjusted to the needs and capacity of the child, and that careful health control can be instituted both in the school and at home. The main argument against the formation of these classes has been the possible psychological reaction upon the child. It must necessarily always be unfortunate to segregate any class of children, particularly those who are normal mentally and who may feel the stigma of this differentiation from normal children of their age. The diagnosis of heart disease also carries with it so many unfortunate possibilities of a fatal termination that there may well be a question as to whether it is wise to allow children to know that they are so affected. Moreover, there are certain practical objections to these classes because of the comparatively small number of children found to have heart disease, the difficulty of adjusting all grades within the limitations of one class teacher's capacity, and the equally hard task of collecting enough children within a given radius to fill such a class. The results obtained in the already-established cardiac classes

would seem to outweigh in their advantages all possible disadvantages that might ensue from such a method. Where classes have been established the concrete results have been a notable diminution in the number of days' absence. In one class the previous absence of these children because of illness, covering two terms, had totalled 492½ days. After they had been placed in cardiac classes the total absences for two terms was 132½ days, or an average gain of 45 days' attendance. The gain in weight by these children placed in cardiac classes has averaged as much as one pound a month. It is probable that much of this gain is due not to the actual segregation of the children, but rather to the opportunity that is afforded for their more systematic and careful medical supervision.

In many communities special clinics for the care of children with cardiac affections have been organized. Notable examples of this type of service are the clinics conducted by Dr. William P. St. Lawrence and Dr. Robert Halsey in New York City. Dr. St. Lawrence estimates that the items necessary for the organized care of cardiac cases are (1) clinic nurse, (2) school service, (3) nose and throat department, (4) dental department, (5) hospital, (6) exercise nurse, (7) education of the mother and child, (8) supervision of the home life of the patient, and (9) the use of country homes when indicated. These special classes for children with cardiac disease are still in process of evolution. The results that have been achieved so far would seem to warrant their continuance in increasing numbers.

Prevention of Heart Disease.—Heart Disease in childhood usually results from some form of rheumatic infection, including acute rheumatism, what are known as growing pains, pains in the joints, infections of various kinds, and chorea (S. Vitus' dance.) Prevention of the occurrence of heart disease is therefore the prevention of these causative factors. There remains, however, an opportunity for the prevention of the more serious forms of the disease, as they may develop from the lighter types of cases, by the

provision of organized work for the care of these children in their homes, in the schools, and under proper medical supervision, whether in private practice, in dispensaries, or in hospitals. The Organization for Prevention and Relief of Heart Disease is a pioneer one in its field. In this, as in other lines of physical disability, the ultimate reduction of the death rate from heart disease in later life will undoubtedly come about through proper attention being paid to the possibility of prevention of cardiac diseases during childhood.

Other Special Classes.—Mention should be made of the special classes that are conducted for (a) children who are crippled, (b) the blind, (c) the deaf, (d) the mentally defective. The need for such special classes is self-evident, and such children must necessarily be segregated for the purpose of education, as well as for proper health supervision.

In the classes for crippled children, the only essential is that they be on the ground floor of the school with some means of transportation of the children to and from their homes, and with specially constructed chairs and desks as part of the classroom equipment.

In the classes for the blind, the equipment must necessarily be suited to the child's lack of vision, and education carried on under the most improved methods that have been devised for teaching the blind. Such classes should be conducted in close co-operation with the sight-conservation classes that have already been mentioned.

Classes or schools for deaf children are also essentially specialized in their methods. Such classes or schools should be closely associated with associations or dispensaries which have for their function the prevention or correction of deafness, so far as that may be possible. Prevention of deafness is largely a matter of prevention of the original cause and stricter attention to the methods that have been found valuable in the prevention of the occurrence of the infectious diseases, particularly scarlet fever, will un-

doubtedly do much to reduce the incidence rate of actual deafness. The methods used in these schools are mainly those that pertain to the education of the deaf in general.

Classes for the mentally defective require a highly specialized technique. We have already discussed the question as to whether or not such classes are a justifiable part of the school program.

Health Education.—Health education may be carried on (a) directly with the children, (b) indirectly through the teachers and parents. A large number of valuable pamphlets containing programs for health teaching in the elementary schools have already been referred to.

The health education of children is based primarily upon the co-operation and interest of the child. Weighing and measuring at frequent intervals, health games, health plays, the drawing or making of health posters, the singing of health songs, following the rules of the health game, the inculcation of health habits and constantly placing before the child the example of health rather than the precept of health, are the basis upon which the program for health teaching is laid. It is obvious that such work, if it is to be successfully carried on, must be under the control of well-trained school doctors, school nurses, or teachers who have had definite training in this regard.

The training of teachers in methods of health education is only now receiving the attention it deserves. The impetus that has been given to this important subject has been the result, mainly, of the work carried on by the former Child Health Organization, now a part of the American Child Health Association, and the Bureau of Education of the United States Department of the Interior. This subject is now beginning to take its proper place in the normal schools and training schools for teachers. The American Child Health Association, with the co-operation of other organizations, notably the Metropolitan Life Insurance Company and some of the better-known foundations, has during the past two years offered a large number of scholar-

ships, open to physicians, nurses, and teachers, for the purpose of affording an opportunity for graduate work in methods of teaching health to children.

The competitive idea is one that should be fostered. Health leagues in each classroom will be found an immense aid in health education. The appointment of one of the children as health officer to serve for a stated period, whose duty it will be to stimulate the children to have their physical defects corrected, to see that they take an interest in their own cleanliness and well-being, to organize, under the teacher's direction, the various health games and plays, to act as a monitor in charge of the individual height and weight charts, and, so far as possible, to keep a record of whether or not the children are carrying out the rules of the health game.

The Rules of the Health Game.—(From the American Child Health Organization.)

(1) A full bath more than once a week.
(2) Brush the teeth at least once a day.
(3) Sleep long hours with windows open.
(4) Drink as much milk as possible, but no coffee or tea.
(5) Eat some vegetables or fruit every day.
(6) Drink at least four glasses of water a day.
(7) Play part of every day out-of-doors.
(8) A bowel movement every morning.

The United States Bureau of Education gives as a slogan for health education, "Make Health Habits Automatic in Youth." Credit may be given for health habits. One of the best methods is that devised by the State Normal School of Trenton, New Jersey, which gives credit on the monthly reports of the child for the following:

Class work 50
1. Personal appearance 10
   1. neatness of dress
      (a) buttons on
      (b) clothes brushed
      (c) shoes shined
   2. hair neatly arranged

2. Personal habits—hygiene 10
   1. cleanliness
      (a) face
      (b) hands
      (c) nails
      (d) teeth
   2. exercises at home
   3. sleeping with window open
3. School housekeeping 10
   1. neatness of desk (inside, outside)
   2. neatness of floor near desk
   3. neatness of cloakroom
   4. appearance of book covers
4. Manners 10
   1. attitude toward teacher
   2. attitude toward classmates
   3. attitude in the home
5. Posture 10
   1. standing
   2. sitting
   3. marching

The public schools of Rochester have developed a most successful group of health clubs throughout the grades, while the Health Leagues in the New York City schools have resulted in a markedly improved interest manifested by the children in the matter of their own health.

The work of the Hunterdon County Health Association is an indication of what may be done in rural communities. Its purpose and program as outlined by the United States Bureau of Education are as follows:

A. The Association and Its Purposes—The Hunterdon County Health Association comprises all the Hunterdon County Health Clubs in the rural schools. Its purpose is to make Hunterdon County boys and girls Healthy, Clean, Happy Citizens. (This meaning of the club initials, H. C. H. C., may be a secret known to club members only.)

B. The Hunterdon County Health Clubs—The pupils of each school shall organize their own Health Clubs. Each room shall elect at least once a month its own health officers. The officers may appoint assistants to help them with their work. The chief health adviser is the teacher.

C. The duties of the pupil health officers and their assistants shall be—

1. to keep the classroom well aired;
2. to assist in keeping room and school ground clean, but not to conflict with the work of a paid janitor;
3. to keep outbuildings clean;
4. to assist with games on playground;
5. to assist in making the daily health inspection.

D. Method of Making Daily Inspection.

1. The chief pupil officer takes the chair and asks the daily inspection questions. Each pupil scores one point for himself and school when he answers "yes" to a question. The club secretary keeps a daily record of points scored by the room. The teacher is judge of all doubtful cases.
2. If a pupil is absent he does not score.
3. At the end of the month the total number of points made by the room is to be divided by the number on roll. This will give the average number of points for the room. A percentage can be found by dividing the average number by the greatest possible number that could be made by a pupil during the month.
4. At the close of the month any school having 75 per cent or over wins a County Association certificate. The school having the highest percentage wins the highest honor of the County Association, a red and white H. C. H. C. banner.

E. The Daily Inspection.

1. Did you sleep with your windows open last night?
2. Did you brush your teeth last night and this morning?
3. Did you wash your face, hands, neck, and ears before coming to school?
4. Are your finger nails clean? (If a pupil bites his nails he does not score until the habit is broken.)
5. Did you do without tea and coffee yesterday?
6. Did you play at least one game yesterday?
7. Did you practice at least three physical-training exercises yesterday?
8. Did you try to sit, stand, and walk correctly yesterday?
9. Did you keep your desk and surroundings in good order yesterday?
10. Did you do at least one helpful deed yesterday?

F. The Weekly Inspection.

On Monday ten extra points may be given as follows:

1. Did you take a bath last week?

2. Did you use your own towel and drinking cup every day last week?

G. At the close of the month 5 per cent may be added to the school's record if the Health Club officers and their assistants have faithfully performed their duties.

H. The club colors are red and white. The club pin is white with the letters H. C. in red.

I. The Health Club pledge is: "I will work to make my body healthy, clean, and strong so that I shall be a good citizen and a happy, useful member of my home and community."

The methods outlined under the discussion of Nutrition Classes will also be found valuable. Specific matters that may be followed in detail are contained in a booklet entitled "Suggestions for a Program for Health Teaching in the Elementary Schools," being Health Education Bulletin No. 10 issued by the Bureau of Education of the Department of the Interior. An excellent outline has also been written by Dr. Florence A. Sherman, Assistant Medical Inspector of Schools for the New York State Department of Education. Doctor Sherman's outline is so inclusive that it should be given in full:

THE RURAL SCHOOL HEALTH PROGRAM: SUGGESTIONS AS TO HOW IT CAN BE MADE MORE EFFICIENT

How the Trustee Can Aid.

1. By interesting himself personally in the sanitary conditions and health equipment of his schools, such as the following:

a. Heating, by at least a properly jacketed stove. Avoid overheating (temperature should never go above 68° F).

b. Thermometer in every school room. Ventilation by open windows, window boards or screens, making this possible all the year.

c. Good light from left or rear, window space being one-fifth of floor space.

d. Schoolhouse should be kept clean, scrubbed, sunned; moist sweeping and dusting at regular intervals.

e. Furniture should be healthful, comfortable, and seats individual, separate, adjustable, clean.

f. Books should be clean, sanitary, and attractive, and so stimulate interest of pupil.

g. Drinking-water from a pure source, with preferably a sanitary drinking fountain.

h. Individual cups, either furnished by board or brought by child (state law).

i. Water for washing hands, individual towels (paper), soap (liquid or shaved).

j. Sanitary toilets, kept healthful, not neglected.

k. Building should be kept in good repair.

l. Provide adequate-sized playgrounds.

2. By appointing his medical inspectors early in the school year, thus making possible earlier correction of defects found.

3. By rendering his reports promptly, and as completely as possible, to the district superintendent at the time specified by the State Department of Education.

4. By visiting the schools occasionally and showing an interest in the health of the pupils and teachers.

How the District Superintendent Can Aid.

1. By additional personal effort and greater endeavor to stimulate the school health program through the teachers, urging a personal interest in each child.

2. By noting sanitary conditions of buildings whenever he visits schools, and seeing that conditions are made and kept healthful—such as heating, ventilation, lighting, cleanliness, healthful seats, drinking-water, washing facilities, toilets, playgrounds.

3. By stimulating competition in his various schools in health efforts, such as daily health-habit instruction, correction of physical defects.

4. By taking a personal interest in all health activities in each of the schools, talking about the same to pupils, teachers, and parents, when the opportunity presents.

5. By notifying the state medical inspector of all conferences with teachers.

6. By endeavoring to show the need and value to parents and trustees of a district school nurse and the possibility of districts combining to obtain one.

How the Teacher Can Aid.

1. By making health a personal asset.

2. By radiating health by example and enthusiasm and so making health contagious, being an example in personal hygiene, personal cleanliness, clothing, etc.

3. By believing in the practice and teaching of daily health habits,

such as plenty of sleep, fresh air, mouth hygiene, food, rest, play, posture and breathing, etc.

4. By seeing that the classrooms are well ventilated and well lighted, and kept in as healthful condition as possible during school hours.

5. By making the physical exercise drills between periods snappy and worth something.

6. By being keenly interested in all school health activities, stimulating a greater endeavor to keep well; teachers, pupils, parents, school doctor and nurse, working together to make this possible.

7. By going over health records on which physical defects are noted at definite periods, and making a personal effort to bring about the correction, by talking with the child and by sending a note to the parent.

8. By knowing, if possible, the parent of every child and endeavoring to work in closest co-operation.

9. By working in closest co-operation with all health activities, in school and out.

10. By seeing that health records of pupils are sent on, with the pupil, from grade to grade and school to school.

How Parents Can Aid.

1. By seeing that children are trained in daily health habits of sleep, baths, foods, mouth hygiene, toilet habits, clothing, rest, play, posture, breathing.

2. By responding quickly to all medical notices sent from the school; by conferring with the family physician or specialist.

3. By believing that the school doctor, nurse, and teacher are friends, not invaders.

4. By taking an active interest in the school program.

5. By visiting schools at intervals, knowing the teachers, and noting sanitary conditions.

6. By insisting on clean and wholesome buildings and healthful equipment.

How the School Doctor Can Aid.

1. By being a hygienist himself in every sense of the word.

2. By embodying and radiating health.

3. By being enthusiastic in his work and so stimulating enthusiasm in his nurses, teachers and pupils.

4. By being interested in keeping up the normal health index in the schools of his district.

5. By outlining his health program to parents, teachers, nurses, and pupils early in the school year, thus securing closer co-operation.

6. By emphasizing the importance of keeping well, by the practice of daily health habits.

7. By explaining and urging to parents the importance of the early correction of defects found and the reasons why.

8. By making these examinations early in the school year and so securing earlier results.

9. By interesting himself and being able to prescribe suitable corrective exercises in postural cases; also by the regulation of group exercises in order to promote the best physical development in normal children.

10. By working in close co-operation with health authorities and with other health agencies. By being strictly ethical in his school work in relation to the family physician.

11. By realizing the importance of his work and the splendid opportunities for service.

How the School Nurse Can Aid.

1. By being physically fit herself.

2. By having the health viewpoint.

3. By practicing daily health habits of sleep, baths, mouth hygiene, foods, rest, play, posture and breathing, clothing, etc.

4. By being enthusiastic and creating a live interest in her health-habit talks in the classrooms.

5. By having as close a touch as possible with the individual teacher, thus aiding in health problems.

6. By greater personal effort in special classes and with individual children in order to bring about desired results.

7. By working in closest co-operation with all health activities in school and outside.

8. By interested and tactful visits to the homes in her efforts to bring about correction of physical defects.

9. By being strictly ethical in her relations to school and family doctor and loyal to school authorities.

10. By making health contagious in her personal contact with all.

Health education of the children embodies the largest single contribution that has been made to the program for child hygiene as it relates to children of preschool and school age. If all children could be taught how to live sanely and healthfully, if they could be made interested in keeping themselves sound and physically fit, if they could absorb the essentials necessary to achieve proper personal hygiene and themselves apply the methods whereby health may be attained, they would inevitably demand the environmental conditions that make health possible. It is not too

much to predict that within another generation the gross insanitary conditions of many communities will disappear as a result of this enlightenment. Children who understand the full value of living in clean, healthful surroundings will demand them for themselves in later years and be equally insistent in their demands that their children shall have such advantages. The things that we in this generation have fought so hard to control and change, including improper housing, overcrowding, lack of community sanitation, the difficult assimilation of alien races, unclean streets, impure water and milk supplies, lack of proper recreation and outdoor facilities, and improper home hygiene, will disappear when public opinion is aroused to the point where such conditions appear intolerable and not to be accepted.

Restrictive legislation and organized effort to correct existing improper conditions are the entering wedge, but the solution of our problems with regard to proper health conditions rests with our children. If we can make them understand the value of healthful conditions and of health itself, they will have them both. Proper health education will give them this information. This education for health should begin as soon as the child is able to respond to any suggestion. How early this may be we are not entirely certain, but it may be safe to say that health habits may be inculcated in children at as early an age as two years. All organized health effort depends for its success upon the extent of the health education of the population at all ages. Health education of adults is a long, complicated, expensive, and only partially successful process. Health education of children is a sure, direct, easy, and economical measure in attaining the desired result. This health education in childhood must necessarily be one of example and environment. Teaching from text books and didactic methods of instruction have failed. Taking the child into partnership is the first step toward success. The modern methods of health education of children offer us an assurance of a future healthy childhood and consequent health in adult

life more certain than any other system or program that has ever been devised.

The health education of children cannot be confined to the home. All national and social organizations that are concerned in raising the health index of childhood must take their part. Direct co-operation between the school and the home is best afforded through parent-teacher associations and mothers' clubs. These associations should be encouraged to undertake courses of study with regard to child health. An excellent program for this purpose has been issued as Health Education Bulletin No. 5, under the title of "Child Health Program for Parent-Teacher Associations and Women's Clubs," published by the Bureau of Education of the Department of the Interior. Summer health and play schools also afford an opportunity for continued health instruction of the children during the months when the schools are closed. A description of the methods to be followed in these schools is contained in Health Education Bulletin No. 3, issued by the Bureau of Education of the Department of the Interior. The co-operation of the dispensaries, clinics, and private physicians of the community should be secured in affording an opportunity for the instruction of teachers in the needed methods of child care.

Programs formulated by the national organizations such as the American Child Health Association, the National Association for Prevention of Tuberculosis, the National School Hygiene Association, the Red Cross, the National Mental Hygiene Association, the United States Children's Bureau, the United States Public Health Service, the United States Bureau of Education of the Department of the Interior, should be used wherever possible. In fact, there is scarcely a part of our national or community life that cannot be drawn into and used in promoting the health and welfare of our children, and yet the teaching of health to children is not in itself complex; it is essentially simple. The methods to achieve health have not been attractive to chil-

dren. It is our opportunity and our responsibility to make them attractive and to work with the child rather than for the child.

Some years ago Dr. William H. Allen published a statement that the success of health work of all kinds consisted in "getting things done" rather than in "doing things." Nowhere is this more true than in the health education of children. "Doing things" means that we expend our own time and effort and the child looks on, but as a more or less interested observer. "Getting things done" means that the child responds and takes his share in the process. With the co-operation of our children all things are possible; without it, little may be achieved. Those of us who are working with children know that we have only to find the right method of approach, and the co-operation is quickly and gladly given.

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APPENDIXES.[1]

Appendix A.—Text of the Act for the Promotion of the Welfare and Hygiene of Maternity and Infancy.

[S. 1039—Sheppard-Towner Act; Public 97—67th Congress; 42 Stat. 135.]

An Act For the promotion of the welfare and hygiene of maternity and infancy, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That there is hereby authorized to be appropriated annually, out of any money in the Treasury not otherwise appropriated, the sums specified in section 2 of this Act, to be paid to the several States for the purpose of cooperating with them in promoting the welfare and hygiene of maternity and infancy as hereinafter provided.

Sec. 2. For the purpose of carrying out the provisions of this Act, there is authorized to be appropriated, out of any moneys in the Treasury not otherwise appropriated, for the current fiscal year $480,000, to be equally apportioned among the several States, and for each subsequent year, for the period of five years, $240,000, to be equally apportioned among the several States in the manner hereinafter provided: *Provided*, That there is hereby authorized to be appropriated for the use of the States, subject to the provisions of this act, for the fiscal year ending June 30, 1922, an additional sum of $1,000,000, And annually thereafter, for the period of five years, an additional sum not to exceed $1,000,000: *Provided further*, That the additional appropriations herein authorized shall be apportioned $5,000 to each State and the balance among the States in the proportion which their population bears to the total population of the States of the United States, according to the last preceding United States census: *And provided further*, That no payment out of the additional appropriation herein authorized shall be made in any year to any State until an equal sum has been appropriated for that year by the legislature of such State for the maintenance of the services and facilities provided for in this Act.

[1] Appendixes A. B. C. and D. from Publication 137, U. S. Children's Bureau.

So much of the amount apportioned to any State for any fiscal year as remains unpaid to such State at the close thereof shall be available for expenditures in that State until the close of the succeeding fiscal year.

SEC. 3. There is hereby created a Board of Maternity and Infant Hygiene, which shall consist of the Chief of the Children's Bureau, the Surgeon General of the United States Public Health Service, and the United States Commissioner of Education, and which is hereafter designated in this Act as the Board. The Board shall elect its own chairman and perform the duties provided for in this Act.

The Children's Bureau of the Department of Labor shall be charged with the administration of this Act, except as herein otherwise provided, and the Chief of the Children's Bureau shall be the executive officer. It shall be the duty of the Children's Bureau to make or cause to be made such studies, investigations, and reports as will promote the efficient administration of this Act.

SEC. 4. In order to secure the benefits of the appropriations authorized in section 2 of this Act, any State shall, through the legislative authority thereof, accept the provisions of this Act and designate or authorize the creation of a State agency with which the Children's Bureau shall have all necessary powers to cooperate as herein provided in the administration of the provisions of this Act: *Provided*, That in any State having a child-welfare or child-hygiene division in its State agency of health, the said State agency of health shall administer the provisions of this Act through such divisions. If the legislature of any State has not made provision for accepting the provisions of this Act the governor of such State may in so far as he is authorized to do so by the laws of such State accept the provisions of this Act and designate or create a State agency to cooperate with the Children's Bureau until six months after the adjournment of the first regular session of the legislature in such State following the passage of this Act.

SEC. 5. So much, not to exceed 5 per centum, of the additional appropriations authorized for any fiscal year under section 2 of this Act, as the Children's Bureau may estimate to be necessary for administering the provisions of this Act, as herein provided, shall be deducted for that purpose, to be available until expended.

SEC. 6. Out of the amounts authorized under section 5 of this Act the Children's Bureau is authorized to employ such assistants, clerks, and other persons in the District of Columbia and elsewhere, to be taken from the eligible lists of the Civil Service Commission, and to purchase such supplies, material, equipment, office fixtures, and apparatus, and to incur such travel and other expense as it may deem necessary for carrying out the purposes of this Act.

SEC. 7. Within sixty days after any appropriation authorized by this Act has been made, the Children's Bureau shall make the apportionment herein provided for and shall certify to the Secretary of the Treasury the amount estimated by the bureau to be necessary for administering the provisions of this Act, and shall certify to the Secretary of the Treasury and to the treasurers of the various States the amount which has been apportioned to each State for the fiscal year for which such appropriation has been made.

SEC. 8. Any State desiring to receive the benefits of this Act shall, by its agency described in section 4, submit to the Children's Bureau detailed plans for carrying out the provisions of this Act within such State, which plans shall be subject to the approval of the board: *Provided*, That the plans of the States under this Act shall provide that no official, or agent, or representative in carrying out the provisions of this Act shall enter any home or take charge of any child over the objection of the parents, or either of them, or the person standing in loco parentis or having custody of such child. If these plans shall be in conformity with the provisions of this Act and reasonably appropriate and adequate to carry out its purposes they shall be approved by the board and due notice of such approval shall be sent to the State agency by the chief of the Children's Bureau.

SEC. 9. No official, agent, or representative of the Children's Bureau shall by virtue of this Act have any right to enter any home over the objection of the owner thereof, or to take charge of any child over the objection of the parents, or either of them, or of the person standing in loco parentis or having custody of such a child. Nothing in this Act shall be construed as limiting the power of a parent or guardian or person standing in loco parentis to determine what treatment or correction shall be provided for a child or the agency or agencies to be employed for such purpose.

SEC. 10. Within sixty days after any appropriation authorized by this Act has been made, and as often thereafter while such appropriation remains unexpended as changed conditions may warrant, the Children's Bureau shall ascertain the amounts that have been appropriated by the legislatures of the several States accepting the provisions of this Act and shall certify to the Secretary of the Treasury the amount to which each State is entitled under the provisions of this Act. Such certificate shall state (1) that the State has, through its legislative authority, accepted the provisions of this Act and designated or authorized the creation of an agency to cooperate with the Children's Bureau, or that the State has otherwise accepted this Act, as provided in section 4 hereof; (2) the fact that the proper agency of the State has submitted to the Children's Bureau detailed plans for carrying out the provisions of this Act, and that such plans have been approved by the

board; (3) the amount, if any, that has been appropriated by the legislature of the State for the maintenance of the services and facilities of this Act, as provided in section 2 hereof; and (4) the amount to which the State is entitled under the provisions of this Act. Such certificate, when in conformity with the provisions hereof, shall, until revoked as provided in section 12 hereof, be sufficient authority to the Secretary of the Treasury to make payment to the State in accordance therewith.

SEC. 11. Each State agency cooperating with the Children's Bureau under this Act shall make such reports concerning its operations and expenditures as shall be prescribed or requested by the bureau. The Children's Bureau may, with the approval of the board, and shall, upon request of a majority of the board, withhold any further certificate provided for in section 10 hereof whenever it shall be determined as to any State that the agency thereof has not properly expended the money paid to it or the moneys herein required to be appropriated by such State for the purposes and in accordance with the provisions of this Act. Such certificate may be withheld until such time or upon such conditions as the Children's Bureau, with the approval of the board, may determine; when so withheld the State agency may appeal to the President of the United States who may either affirm or reverse the action of the Bureau with such directions as he shall consider proper: *Provided*, That before any such certificate shall be withheld from any State, the chairman of the board shall give notice in writing to the authority designated to represent the State, stating specifically wherein said State has failed to comply with the provisions of this Act.

SEC. 12. No portion of any moneys apportioned under this Act for the benefit of the States shall be applied, directly or indirectly, to the purchase, erection, preservation, or repair of any building or buildings or equipment, or for the purchase or rental of any buildings or lands, nor shall any such moneys or moneys required to be appropriated by any State for the purposes and in accordance with the provisions of this Act be used for the payment of any maternity or infancy pension, stipend, or gratuity.

SEC. 13. The Children's Bureau shall perform the duties assigned to it by this Act under the supervision of the Secretary of Labor, and he shall include in his annual report to Congress a full account of the administration of this Act and expenditures of the moneys herein authorized.

SEC. 14. This Act shall be construed as intending to secure to the various States control of the administration of this Act within their respective States, subject only to the provisions and purposes of this Act.

Approved, November 23, 1921.

Appendix B.—Rulings of the Comptroller General of the Treasury

The rulings of the Comptroller General of the United States Treasury in connection with the appropriations for carrying out the maternity and infancy act have been in substance as follows:

1. That so much of the 1922 appropriation as was paid to a State and as remained unexpended on June 30, 1922, was to be available for expenditure within the State until the close of June 30, 1923. (May 12, 1922.)

2. That so much of the 1922 appropriation as was apportioned to a State and as remained unpaid to such State at the close of June 30, 1922, was to be available for payment to the State at any time during the fiscal year 1923 and for expenditure until the close of June 30, 1923.[1] (May 12, 1922.)

3. That any interest accruing while the moneys are held by the State inures to the benefit of the United States as owner of the funds and not to the States as trustees, and should be accounted for and paid into the United States Treasury accordingly. The law does not contemplate, however, that the money shall be held by the States and bear interest, but shall be promptly applied to the purpose for which furnished and the amounts should not be furnished in amounts necessarily resulting in large sums being held and thus bearing interest. (May 12, 1922.)

4. That in case the State fails to appropriate an amount specifically equal to the amount of the allotment authorized by the Federal appropriation, moneys applied to the same purpose through other State appropriations may not be considered as making the appropriated funds of the State equal to the allotments authorized by the Federal appropriation, unless it is established that the fact that the other ap-

[1] This same ruling applied to appropriations for succeeding fiscal years—that is, so much of an appropriation for any Federal fiscal year as was apportioned to a State was available for payment to and expenditure in such State for a two-year period, that period beginning July 1 of the fiscal year for which the appropriation was made, and ending June 30 of the succeeding fiscal year.

propriation was available for the "services and facilities provided for in this Act" controlled the State legislature in making its specific appropriation, in which case there would be justification for considering these moneys in determining that the amount appropriated by the State is equal to the Federal allotment. (June 23, 1923.)

Appendix C.—Instructions for Accounting Under the Act

Accounts and Vouchers.

Accounts and vouchers for both Federal and State funds used in promoting the welfare and hygiene of maternity and infancy under the Sheppard-Towner Act should be regularly kept at the State agency responsible for the local administration of the act so that if examined at any time by a representative of the Children's Bureau it will be possible to ascertain the exact expenditures made. If the original accounts and vouchers are kept in the office of the State treasurer and the responsible State agency keeps only duplicate vouchers, these duplicates should bear evidence of their payment by reference to the warrant or otherwise. Expenditures from both Federal and State funds which are included in the account of an appropriation for any Federal fiscal year should be confined to those actually made in the maintenance of the services and facilities provided for in the Sheppard-Towner Act during the two-year period for which the appropriation is available. Separate accounts for expenditures of the Federal fund and the State fund used in matching the Federal fund should be kept in accordance with the provisions of the financial schedules prescribed by the Children's Bureau and should be supported by vouchers approved by the director of the State agency. If the State appropriation for the hygiene of maternity and infancy is larger than the amount used to match the Federal allotment, a separate account of so much of the State's appropriation as is used to offset the Federal fund should be kept.

The classification of expenditures in accordance with the headings prescribed by the Children's Bureau should be indicated on all vouchers or accompanying jackets. Every voucher should further indicate the fund, whether Federal or State, from which the expenditure is made.

There should be a pay roll or an individual voucher which should indicate the period for which the salary charge is made, the annual rate of salary, general description of duties (grade or title), and, if paid by cash, should contain the personal signature of each individual and the indorsement of the director of the State agency. Separate pay rolls for salaries under the Sheppard-Towner Act should be kept.

Vouchers for travel should give the purpose and dates for each trip and show an itemized account of all railroad and boat fares, livery,

bus, and street car expenses, payments for subsistence, and miscellaneous items. The voucher should contain the personal signature of the individual paid and the indorsement of the director of the responsible State agency. There should be vouchers to show the purchase of mileage books and subvouchers to show how and when the mileage was used. Expenses for supplies and other material should not be included in travel accounts.

There should be an itemized account of all supplies and miscellaneous articles purchased and the vouchers should indicate the date when the goods were received and the date of payment, and should bear the signature of the payee and indorsement of the director.

CLASSIFICATION OF EXPENDITURES.

The first scheme for classification of accounts by items of expense provided for eight ledger headings as follows:

1. Salaries—Entire staff, both office and field, professional and clerical.
2. Printing—Publications, etc.
3. Supplies—Office and scientific supplies.
4. Furniture—Typewriters, office desks, tables, and so forth.
5. Express and freight—Cartage, drayage, and so forth.
6. Telegraph and telephone.
7. Traveling expenses—In connection with promoting the welfare and hygiene of maternity and infancy only—running expenses of automobile, purchase of automobile, railroad fare, subsistence while in the field, and so forth.
8. Miscellaneous—To be itemized in detail.

Appendix D

State Bureaus of Child Hygiene 1924

Alabama	1920	Bureau of Child Hygiene and Public Health Nursing, State Board of Health, Montgomery.
Arizona	1919	Child Hygiene Bureau, State Board of Health, Phœnix.
Arkansas	1919	Bureau of Child Hygiene, State Board of Health, Little Rock.
California	1919	Bureau of Child Hygiene, State Board of Health, San Francisco.
Colorado	1918	Child Welfare Bureau, Department of Public Instruction, Denver.
*Connecticut	1919	Bureau of Child Hygiene, State Board of Health, Hartford.
Delaware	1921	Child Welfare Department, State Health and Welfare Commission, Dover.
Florida	1918	Bureau of Child Welfare, State Board of Health, Jacksonville.
Georgia	1919	Bureau of Child Hygiene, State Board of Health, Atlanta.
Idaho	1919	Division of Child Hygiene, Department of Public Welfare, Boise.
Iowa	1922	Division of Maternal and Infant Hygiene, State University, Iowa City.
*Illinois	1917	Division of Child Hygiene and Public Health Nursing, State Department of Public Health, Springfield.

Indiana	1919	Division of Infant and Child Hygiene, State Board of Health, Indianapolis, Ind.
*Kansas	1915	Division of Child Hygiene, State Board of Health, Topeka.
Kentucky	1919	Division of Child Hygiene, State Board of Health, Louisville.
*Louisiana	1910	Division of Hygiene, State Board of Health, New Orleans.
*Maine	1920	Division of Public Health Nursing and Child Hygiene, State Board of Health, Augusta.
*Massachusetts	1915	Division of Hygiene, State Department of Public Health, Boston.
Maryland	1922	Bureau of Child Hygiene, State Department of Health, Baltimore.
Michigan	1920	Bureau of Child Hygiene and Public Health Nursing, State Board of Health, Lansing.
Minnesota	1922	Division of Child Hygiene, State Board of Health, St. Paul.
Mississippi	1920	Bureau of Child Welfare, State Board of Health, Jackson.
Missouri	1919	Division of Child Hygiene, State Board of Health, Jefferson.
Montana	1917	Child Welfare Division, State Board of Health, Helena.
Nebraska	1921	Division of Child Hygiene, Health and Welfare, Lincoln.
Nevada		Child Welfare Division, State Board of Health, Reno.
New Hampshire		Bureau of Maternity, Infancy and Child Hygiene, State Board of Health, Concord.
New Jersey	1915	Bureau of Child Hygiene, State Department of Health, Trenton.

New Mexico	1917	Bureau of Child Welfare, Board of
Reorganized	1921	Public Welfare, Santa Fe.
	1920	Division of Child Hygiene and Public Health Nursing, Bureau of Public Health, Department of Public Welfare, Santa Fe.
New York	1914	Division of Maternity, Infancy and Child Hygiene, State Department of Health, Albany.
North Carolina	1919	Bureau of Maternity and Infancy, State Board of Health, Raleigh.
North Dakota	1922	Bureau of Child Hygiene and Public Health Nursing, State Department of Public Health, Bismarck.
Ohio	1915	Bureau of Child Hygiene, State Department of Health, Columbus.
Oklahoma	1922	Bureau of Maternity and Infancy Hygiene, State Department of Health, Oklahoma City.
Oregon	1921	Division of Child Hygiene, State Board of Health, Portland.
Pennsylvania	1919	Division of Child Health, State Department of Health, Harrisburg. The co-operating agency in adminstering the Maternity and Infancy Act in Pennsylvania is the Preschool Division, Bureau of Child Health, State Department of Health, Harrisburg.
*Rhode Island	1919	Division of Child Welfare, State Board of Health, Providence.
South Carolina	1919	Bureau of Child Hygiene and Public Health Nursing, State Board of Health, Columbia.
South Dakota	1921	Division of Child Hygiene, State Board of Health, Waubay.

Tennessee	1922	Bureau of Maternity and Child Welfare, State Board of Health, Nashville.
Texas	1919	Bureau of Child Hygiene and Public Health Nursing, State Board of Health, Austin.
Utah	1922	Bureau of Child Hygiene and Public Health Nursing, State Board of Health, Salt Lake City.
*Vermont	1921	Division of Child Hygiene, State Board of Health, Burlington.
Virginia	1918	Child Welfare Bureau, State Board of Health, Richmond.
Washington	1920	Bureau of Child Welfare, State Board of Health, Seattle.
West Virginia	1919	Division of Child Hygiene and Public Health Nursing, State Department of Health, Charleston.
Wisconsin	1919	Bureau of Child Welfare and Public Health Nursing, State Board of Health, Madison.
Wyoming	1922	Bureau of Maternal and Infant Hygiene, State Board of Health, Cheyenne.

* The eight states which have not accepted the Maternity and Infancy Act are starred.

Appendix E

Regulations Governing the Physical Examination of School Children

The following are the standard methods employed in the physical examination of children in the New York City public and parochial schools:

A health certificate, prepared in accordance with the regulations of the Department of Health, and signed by a duly licensed physician authorized to practice medicine in the State of New York, shall be furnished by each pupil at the time of his or her admission to a public or other free school supported in whole or in part by funds obtained from direct taxation.

If any such pupil shall not present a health certificate, as required herein, the principal or teacher in charge of the school shall cause a notice to be promptly sent to the parent, guardian, or other person having the care, custody, or control of such pupil, to the effect that, if the required health certificate be not presented within ten days thereafter, a physical examination of such pupil will be made by a medical inspector of the Department of Health.

Every principal or teacher, in charge of a public or other free school, supported in whole or in part by funds obtained from direct taxation, shall report to the medical inspector of the Department of Health having jurisdiction over the health of the pupils in such school, the names of all pupils who shall not have furnished such health certificate within ten days following the date of the sending of such notice.

Regulation 1. Physical Examination: points to be included.

The physical examination of school children, made by

physicians in accordance with Section 200 of the Sanitary Code, must include the following points:

Test for vision.
Test for hearing.
Test for defective nasal breathing.
Examination for hypertrophied tonsils.
Examination for defective teeth.
Determination of nutrition.
Examination of the heart.
Examination of the lungs.
Examination for orthopedic defects.
Examination for nervous diseases.

Regulation 2. Physical examinations method.

The method of examination must include the following procedure as minimum requirement:

(a) *Vision Test:* The Snellen test card, or its equivalent, to be used. A separate examination and record of the visual acuity of each eye is required, a card or paper to be used to cover the eye not being tested. Figure charts to be used for children not knowing their letters.

(b) *Hearing Test:* The watch test to be used, each ear to be tested separately.

(c) *Defective Nasal Breathing:* The nasal passages to be cleared, each nostril to be tested separately. Record is to be made as to cause of obstruction, if any is found. Secondary symptoms, as nasal catarrh or mouth breathing, should be noted, the latter to be qualified as to whether due to (a) habit or (b) obstruction of nasal passage.

(d) *Hypertrophied Tonsils:* Visual examination of the pharynx to be made with the use of a tongue depressor.

(e) *Defective Teeth:* Visual examination of the interior of the mouth to be made. Uncleanliness, caries, and malocclusion must be recorded.

(f) *Nutrition:* To be determined by taking into consideration the relation of height, weight, and age to one another. The state of the muscular tissues should be noted, and the color of the skin and mucous membranes

must also be recorded. Any height or weight below those indicated in the following table for ages specified must be stated:

AVERAGE HEIGHT AND WEIGHT

	(Height—inches)		(Weight—pounds)	
Age	*Boys*	*Girls*	*Boys*	*Girls*
5	41.7	41.4	41.2	39.8
6	44.1	43.6	45.1	43.8
7	46.2	45.9	49.5	48.0
8	48.2	48.0	54.5	52.9
9	50.1	49.6	60.0	57.5
10	52.2	51.8	66.6	64.1
11	54.0	53.8	72.4	70.3
12	55.8	57.1	79.8	81.4
13	58.2	58.7	88.3	91.2
14	61.0	60.3	99.3	100.3
15	63.0	61.4	110.8	108.4
16	65.6	61.7	128.7	113.0

(Weight includes ordinary clothing.)

(g) *Heart:* Heart to be examined with stethoscope, and all abnormalities recorded.

(h) *Lungs:* Lungs to be examined by percussion and auscultation, using the stethoscope, and all abnormalities recorded.

(i) *Orthopedic Defects:* General inspection of the body to be made. Impaired motility or defects of posture must be recorded.

(j) *Nervous Affections:* Note whether functional or organic.

SUMMARY OF LAWS AND REGULATIONS GOVERNING MID-

(COMPILED BY DR.

State and date of enactment[1]	Examined and licensed by state	Educational or other requirements	Registration
Alabama Laws 1919	No; by county board	Knowledge of midwifery; freedom from communicable disease, and moral character	Local
Arizona R. S. 1913, and State Board of Health rules	Permit only	Endorsement of physician of district	Local
Arkansas State Board of Health rules 1913	.....	.....	Local
California Medical Practice Act 1917	Yes	Four years high school; specified professional training and examination	Local
Colorado Medical Practice Act 1917	Yes	Examination in such subjects as Board deems necessary	Local
Connecticut General Statutes, 1893	Yes	Graduation from School of Midwifery; certificate of character and examination	State and local annual
Delaware Rev. Code 1915	.....	.....	Local
Florida Laws 1915	.....	.....	Local
Georgia Code 1915	.....	.....	Local
Idaho Laws 1911	.....	.....	Local
Illinois Medical Practice Act 1917[2]	Yes	Graduation from graded school and from school of midwifery and examination	Local
Indiana Medical Practice Act 1897	Yes	High school; four years or equivalent; diploma from obstetric school and examination	Local
Iowa Laws 1897	Yes	.....	Local
Kansas General Statutes 1915	.....	.....	Local

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WIVES IN THE UNITED STATES, IN FORCE MARCH, 1923

ANNA E. RUDE)

Laws and regulations governing practice	Penalties for violations of requirements of practice	Report births	Report ophthalmia and use prophylactic
.....	.....	Yes	Yes[8]
Shall not give drugs, give injection into birth canal, or make internal examinations; shall secure physician for abnormal cases	Permit valid so long as law and rules obeyed	Yes	Report and advise use of prophylactic
.....	.....	Yes	Report and advise use of prophylactic
Shall not give drugs, use instruments, make internal examinations, or give injection into birth canal; shall attend normal cases only; must have specified equipment	Revocation of license, $100-$600 or 60-180 days, or both	Yes	Report; use of prophylactic optional[8]
Shall not give drugs or anæsthetics, use instruments, or practice medicine in any other form	Revocation of license, $50-$300 or 10-30 days, or both	Yes	Yes
Bill defining practice before present General Assembly	.....	Yes	Yes[8]
.....	.....	Yes	Yes[8]
.....	.....	Yes	Report only
.....	.....	Yes	Yes
.....	.....	Yes	Yes[8]
Shall not give drugs or attend abnormal cases	Revocation of license, not over $100 or 6 months, or both	Yes	Report only;[3] may advise or use with consent of parent
.....	From $25-$200 or revocation of license	Yes	Report and use in suspected cases
.....	.....	Yes	Yes
.....	.....	Yes	Report and use with limitations[8]

State and date of enactment [1]	Examined and licensed by state	Educational or other requirements	Registration
Kentucky State Board of Health rules 1915	Permit only given by county health officer	Attendance at annual course of instruction; understanding of essentials of hygiene; freedom from communicable disease	Local annual
Louisiana Act 1918	Yes	Such examination as required by State Board of Medical Examiners	Local
Maine	.....	.....	.....
Maryland Code of 1910	Yes	Ability to read and write; certificate of physician showing attendance at five cases; three certificates as to character	Local
Massachusetts	.....	.....	.....
Michigan	.....	.....	.....
Minnesota General Statues 1913	Yes	Diploma from School of Midwifery or examination	No
Mississippi State Board of Health rules 1912	Permit given by county health officer	Attendance at class instruction; investigation as to character, cleanliness, etc.	Local
Missouri Rev. Statutes 1909	Yes	Examination in obstetrics	Local
Montana Rev. Code 1921	.....	.....	Local
Nebraska	.....	.....	.....
Nevada Revised Laws 1912	.....	.....	Local
New Hampshire State Board of Health Rules 1916	.....	.....	Local

Laws and regulation governing practice	Penalties for violations of requirements of practice	Report births	Report ophthalmia and use prophylactic
Shall not give drugs, use instruments, give injections into birth canal and make internal examination, or attend abnormal cases; shall observe other specified sanitary rules	Permit valid so long as law and rules are obeyed	Yes	Yes[3]
.....	.....	Yes	Yes[3]
.....	.....	Yes	Report use prophylactic unless parent objects
Shall not give drugs, use instruments, make internal examinations, or attend abnormal cases	From $5 to $10, revocation of license for third offense	Yes	Report only
.....	.....	.....	.....
.....	.....	Yes	Yes
.....	Revocation of license	Yes	Report and use prophylactic unless parent objects[3]
Shall not give drugs, use instruments, give injection into birth canal, or attend abnormal cases; must have specified equipment	From $5 to $100 or 60 days, or both	Yes	Yes[3]
Shall engage in no other branch of medical practice	From $10 to $50 or 10 days to 2 months, or both	Yes	Yes
.....	.....	Yes	Report and use of prophylactic optional[3]
.....	.....	Yes	.....
.....	.....	Yes	Yes
Shall not give drugs or use instruments; local health boards must have physician or nurse visit all cases attended by midwives	.....	Yes	Yes[3]

State and date of enactment [1]	Examined and licensed by state	Educational or other requirements	Registration
New Jersey Laws 1910	Yes	Common school; certificate or diploma from school of midwifery or maternal hospital having 1,800 hours' instruction and examination	Local
New Mexico State Board Public Welfare rules 1921	Permit and examination annually	Attendance at series of ten classes of instruction, signing of midwife's pledge and freedom from communicable disease	Local
New York [4] General Laws 1922	Examine and license annually	Ability to read and write (waived for foreigners); either diploma from school of midwifery or other satisfactory evidence	Local
North Carolina Statutes 1919	Permit only	Must not be addicted to drugs or habitual drunkenness	State
North Dakota Laws 1907	.....	.....	Local
Ohio Medical Practice Act 1910	Yes	High school or equivalent; diploma from school of midwifery or license of foreign country and examination	Local
Oklahoma Laws 1917	.....	.....	Local
Oregon Laws 1915	.....	.....	Local
Pennsylvania Laws 1913 and Department of Health rules	Yes	Graduation from approved school of midwifery or other satisfactory evidence and examination in English language only	Local
Rhode Island Laws 1918	Licensed only	.....	.....
South Carolina State Board of Health rules 1920	Permit only	Completion of course of ten lessons given by State Board of Health; signing of midwife pledge	Local

Laws and regulations governing practice	Penalties for violations of requirements of practice	Report births	Report ophthalmia and use prophylactic
Shall not give drugs; shall secure physician in all abnormal cases of mother or infant	$200 or 100 days; if fine not paid, revocation of license	Yes	Report [3]; use of prophylactic optional
Shall not give drugs, give injection into birth canal, use instruments, or make internal examination; shall call physician in all abnormal cases and have specified equipment	Certificate may be annulled	Yes	Yes
Shall not give drugs, use instruments, remove adherent placenta, perform version, or treat disease; shall attend normal cases only	License revoked	Yes	Yes
Disinfection of hands of practitioner is required	From $5 to $10	Yes	Yes [3]
.....	.....	Yes	Report; use prophylactic in suspected cases
Shall not perform version, treat breech or face presentation or other abnormal conditions or use instruments	Refusal; suspension; revocation of license for unprofessional conduct	Yes	Yes
.....	.....	Yes	Yes [3]
.....	.....	Yes	Yes
Shall not prescribe drugs, perform operations other than tying cord; shall notify inspector of all abnormal cases, also of delayed labor; other sanitary requirements	From $10 to $50 or 10 to 50 days, or both; license may be revoked or suspended	Yes	Yes
State Board of Health makes rules and regulations	Not over $100 or 6 months, or both; license may be revoked	Yes	Yes [3]
Shall not give drugs, give injection into birth canal, or make internal examinations; shall secure physician for abnormal cases and obey rules of personal hygiene	Permit may be revoked	Yes	Report; use of prophylactic advised

State and date of enactment [1]	Examined and licensed by state	Educational or other requirements	Registration
South Dakota	.....	.....	.....
Tennessee	.....	.....	Local
Texas	.....	.....	.....
Utah	.....	.....	Local
Vermont	.....	.....	.....
Virginia Laws of 1918 and State Board of Health Rules	Permit only	.....	Local
Washington Act of 1917	Yes	Common school education, diploma from school of midwifery, application endorsed by physician and examination	Local
West Virginia	.....	.....	.....
Wisconsin Statutes 1919	Yes	Diploma from College of Midwifery; evidence of good morals and professional character, and examination	Local
Wyoming	.....	.....	.....

[1] Date refers to passage of act, without reference to subsequent amendments.
[2] This law declared unconstitutional by the Illinois Supreme Court.
[3] Gratuitous distribution of a prophylactic is made by the state health authorities.
[4] New York City and Rochester have special laws.

Laws and regulations governing practice	Penalties for violations of requirements of practice	Report births	Report ophthalmia and use prophylactic
.....	.....	Yes	Report only [8]
.....	.....	Yes	Yes
.....	.....	Yes	Shall use prophylactic [8]
.....	.....	Yes	Report; advise use of prophylactic [8]
.....	.....	Yes	Yes [8]
Shall not give drugs, give injection into birth canal (except when ordered by doctor), make internal examinations, or attend abnormal cases; shall obey other sanitary rules	Revocation of permit	Yes	Yes [8]
Shall not prescribe medicine or drugs; shall call physician in abnormal cases; shall report puerperal contagion or infectious disease to health officer	Revocation of license; $80 to $200 or 10 days to 6 months, or both	Yes	Yes
.....	.....	Yes	Yes [8]
Shall not administer drugs, use instruments, or any artificial means, remove adherent placenta, or undertake any other form of medical practice	Revocation of license; $25 to $100 or not over 6 months, or both	Yes	Yes [8]
.....	.....	Yes	Yes

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